

Origin, destination and convergence: Understanding the fertility of international migrants and their descendants

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September 2015

*A thesis submitted to the Department of Social Policy of the London School of
Economics and Political Science for the degree of Doctor of Philosophy, London,
September 2015*

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I confirm that my first thesis paper, which is presented in chapter 2, is jointly co-authored with my supervisor Professor Wendy Sigle. My final paper, presented in chapter 5, is jointly co-authored with my supervisor Dr. Jouni Kuha. In both cases, I carried out the majority of the work. Further details are provided in the table below.

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Data management		BW	BW	BW
Analysis		BW	BW	BW
Interpretation of analysis		BW	BW	BW & JK
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Final draft of text	BW	BW	BW	BW

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Note on the data used in chapter 5:

The permission of the Office for National Statistics to use the Longitudinal Study is gratefully acknowledged, as is the help provided by staff of the Centre for Longitudinal Study Information & User Support (CeLSIUS). CeLSIUS is supported by the ESRC Census of Population Programme (Award Ref: ES/K000365/1). The results shown here are released under clearance number 30135. The authors alone are responsible for the interpretation of the data. Census output is Crown copyright and is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

ABSTRACT

Research on migrant fertility has often found differences between the childbearing of migrants and natives. These 'differentials' are important because they demonstrate how migrants contribute towards population change. They can be also used to investigate how living in a new destination affects the fertility of immigrants and their descendants. This is especially true when demographers study how differentials change over time as a process of convergence. Unfortunately, the literature on migrant fertility differentials suffers from a number of limitations. Firstly, existing definitions of migrant fertility convergence are ambiguous. It is unclear what the concept means, and how it should be tested. Secondly, researchers have limited knowledge about variation in differentials over the life course, in particular for women who have completed childbearing. Thirdly, there is a lack of empirical research that examines why differentials exist, and whether they can be explained by exposure to cultural norms. This thesis responds to these issues with four papers, one that critically evaluates convergence, and three that analyse migrant fertility in the UK. The results show evidence of generational convergence for some descendants of immigrants, notably those with Irish and Jamaican ancestry, but evidence against convergence for the descendants of immigrants from Pakistan and Bangladesh. These results are partly explained by childhood socialisation and culturally entrenched fertility norms, such that differentials are lower for child migrants who grow up in areas where they are more likely to be exposed to native cultural norms. Overall, the results show that differentials vary considerably over the life course, and follow very different patterns for different migrant groups. The findings suggest that researchers must be careful when trying to make generalisations about migrant fertility behaviour. They also highlight the immigrants, descendants, life course stages, and explanations of migrant fertility that may be most fruitfully studied by future research.

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ACKNOWLEDGEMENTS

It was almost four years ago that I began this thesis, and a number of vital events have occurred since then. My family status has transitioned from living apart together (LAT) to cohabiting with a dependent child, and along the way I've experienced migrant fertility first hand. There have been more than 3 million births in the UK since I started this thesis, and thankfully I only had to register one of them. In 2014, along with around 266 other sets of parents in England and Wales, Ellie and I visited the local register office and chose the name Ezra. And as I write this now, Ezra is almost 18 months old, with a long future of demographic events ahead of him.

I'm sure that I won't remember everyone who I should thank by name for helping me reach this not quite so vital event of thesis submission, but the two most important names are easy. Wendy and Jouni, I can't thank you enough for all your time and patience. I'm sure you'll be glad that you don't ever have to read my introduction again, but it's sad to be finishing my apprenticeship, and I hope that you realise just how much I've learnt from you both.

Thanks must go to all my colleagues at LSE, especially everyone in Social Policy and Methodology. I've been lucky to have so many supportive friends, and to have been given so many great opportunities. In particular, thanks to all those who helped me pay the bills over the last four years, including: the ESRC, LSE, Methodology, Tim, Mike, Paul, Dominik and Marco. Thanks to all the PhD crew, to Alice for all your guidance, Valeria for all those long chats about research, and especially Rachel for looking after the wee-man and giving him so much love. Thanks to everyone else who ever shared a brew in the PhD kitchen, or on campus, or at conferences, or anywhere else. And thanks to everyone who ever gave me feedback on my research. I've definitely missed a bunch of people, and I'm sorry if your name's not down, but now that I've almost finished, how about I buy you a beer?

“L'état démographique de l'ensemble de la colonie étrangère n'est qu'une moyenne dans laquelle se trouvent fondus les états démographiques des diverses nationalités qui la composent. Il est intéressant de les étudier séparément.”

“The demographic state of the foreign-born population is merely an average that combines the demographic conditions of the various nationalities of which it is composed. It is interesting to study them separately.”

(Dumont, 1894 p.422; author's translation)

EXTENDED ABSTRACT

The aim of this thesis is to develop new knowledge about the fertility of international migrants and their descendants. Migrant fertility, which can refer to the childbearing of both international and internal migrants, has been studied by demographers for more than 100 years. Research on the topic has typically been motivated by two broad goals: the desire to understand how migrants contribute toward population change, and the desire to understand how living in a new destination affects migrant behaviour. One of the most common concerns for demographers has therefore been the extent to which migrant fertility is different from the fertility of native populations. The majority of research has aimed to assess and explain these differences, often referred to as differentials. Furthermore, by evaluating how differentials change over time, research has frequently tried to establish whether migrant fertility converges with that of natives, either by studying immigrants, the descendants of immigrants, or comparing these two groups.

The introduction to this thesis begins by explaining what is meant by migrant fertility in the context of this thesis. It then provides a detailed explanation of why it is important for demographers to study this topic. After that, the introduction reviews previous research on migrant fertility differentials, including research that has studied convergence. In addition to describing what can be learnt from the literature, this review helps to identify some of its most important limitations. Those that are the focus of this thesis can be summarised briefly as follows. Firstly, although a lot of researchers have studied the convergence of migrant fertility, there is no consensus about how to define convergence or how it should be evaluated. Research that aims to understand assimilation or the impact of migration on population change may be undermined by this lack of clarity. Secondly, researchers have not investigated how immigrant fertility differentials vary across the reproductive life course of individuals. This is despite the fact that life course variation shows how immigrants contribute to population change at different ages, and

highlights the groups who are worthy of further research, including studies of convergence. Thirdly, there is a lack of empirical research that explains why differentials exist, and why they might persist for the descendants of immigrants. In particular, differentials may be explained by exposure to cultural norms, but only a handful of studies have explored this prediction directly, and most of these are hard to interpret because of the methods that have been used.

Having reviewed the literature, the introduction then describes how this thesis responds to these limitations. It introduces the aims of the four thesis papers, and explains how the papers interrelate. Considered as a whole, the aim of the thesis is to develop a greater understanding of migrant fertility differentials by studying the childbearing of international migrants and their descendants. Immigrants and their descendants are of particular contemporary interest in high income countries, where international migration, and its impact on society, has become an important concern for voters, politicians, policy-makers, campaign groups, and the media. As an example of a country where both immigration and immigrant fertility are of keen interest to these groups, this thesis carries out an empirical study of the UK. The introduction provides some salient background on the UK context, and describes in more detail why it is beneficial to study the UK. In addition to being of interest in its own right, a study of the UK has considerable relevance for research in other contexts. For instance, the UK shares a similar interest in migrant fertility with many other European countries, and is a fitting case to investigate the heterogeneity of migrant fertility by origin and ancestry.

The four thesis papers are presented in chapters 2-5, and the first of these responds to the lack of clarity that surrounds the concept of migrant fertility convergence. It takes a critical approach to the concept, and in doing so creates a typology of convergence that varies according to the aims of research. This typology provides a lens through which to view previous studies, and provides a range of recommendations that can be used by empirical

researchers. Several of these recommendations are used to inform the other papers in this thesis, including a study of differentials over the life course (chapter 3), and an investigation of completed fertility convergence across migrant generations (chapter 4).

Chapter 3 investigates how migrant fertility differentials vary over the reproductive life course for women who have reached the end of their reproductive years. A similar analysis does not appear to have been carried out before. This is despite the fact that it can identify patterns that are hidden by a partial analysis of the life course, and therefore highlight some of the most likely explanations for the childbearing of different immigrant groups. Using data from Understanding Society, a longitudinal study of the UK, the results show that the profile of differentials varies considerably over the life course for different immigrant groups, especially by age at migration. For example, immigrants have significantly higher completed fertility (at age 40) than UK-born natives if they were born in India, Pakistan, Bangladesh, Jamaica, or Western and Central Africa. But at age 20, only women from Bangladesh or Jamaica have significantly more children on average than UK-born natives, and women from Western and Central Africa have significantly fewer. For high income origins, there is a consistent pattern of delayed fertility at early ages, and this pattern is of particular interest for child migrants from South and East Europe because it suggests evidence against childhood socialisation for these groups. Taken together, the results of this paper imply that researchers should consider heterogeneity when analysing immigrant fertility.

The next chapter (4) builds on this analysis by studying migrant heterogeneity alongside a test of generational fertility convergence. The analysis is based on the empirical implications of this concept that are outlined in chapter 2, and uses the same data as chapter 3. It therefore compares the completed fertility of first generation migrants from one birth cohort group, to the fertility of their descendants who are born (on average) twenty-five years later. This allows the analysis to test one of the theoretical predictions of

intergenerational assimilation, and to develop new knowledge about the long-run impact of migrants on population dynamics in the UK. The results show evidence of generational fertility convergence for some descendants of immigrants, including those with Irish and Jamaican ancestry. However, there is evidence against convergence for other groups, including the descendants of immigrants from Pakistan and Bangladesh, a finding which supports the cultural entrenchment hypothesis.

In chapter 5, the final paper investigates the hypothesis of cultural entrenchment, but in a wider investigation of cultural explanations for migrant fertility differentials. This chapter evaluates the relationship between exposure to cultural norms and differences between migrant and native populations in their completed fertility. As established in chapter 2, these differentials are at the heart of the concept of convergence, which considers whether differentials are changing over time. And as established in chapters 3 and 4, there is considerable variation in these differentials for different origin groups and different migrant generations. One common explanation for the existence of migrant fertility differentials is exposure to cultural norms in childhood, which is frequently referred to as the childhood socialisation hypothesis. Chapter 5 carries out a test of this hypothesis using longitudinal data for England and Wales. The results provide evidence that childhood exposure, as measured by segregation and community composition, explains variation in completed fertility differentials, in particular for immigrants and their descendants from Pakistan and Bangladesh. Importantly, this finding is consistent for different measures of community composition, thus reinforcing its validity.

Considered as a whole, this thesis demonstrates how explicit and coherent approaches to concepts, methods, and measures can be combined in order to describe and explain migrant fertility differentials. In addition to illustrating the direction for future research, it presents a number of substantive findings that suggest the different contribution that migrants will make to population change. It is evident that this contribution will depend upon their

background, in particular their origin country. In addition, there is evidence that living in a new destination has an impact on the completed fertility of the descendants of migrants via childhood exposure to cultural norms. These results offer new insights for the demographic study of migrant fertility, both in general, and with reference to the demography of the UK.

1. Introduction

In this introduction, I set out the terms of my thesis, including the aims of my research, how these aims derive from the literature, and how the separate aspects of my thesis link together in order to make a coherent contribution to knowledge. The introduction begins with an overview of what demographers mean when they refer to migrant fertility, and how migrant fertility is defined in this thesis (section 1.1). It then explains why migrant fertility is an important topic for demographers to study (section 1.2).

The next section (1.3) carries out a review of the literature, which is motivated by two questions: *How have migrant fertility and migrant fertility differentials been studied by demographers? And in what ways can research be developed to improve our understanding of the childbearing of immigrants and their descendants?* The answers to these questions are used to derive the research agenda for the rest of the thesis, including the research questions for the four thesis papers.

Before these papers are presented in chapters 2-5, the penultimate section of the introduction (1.4) describes the context of the empirical research in this thesis, and explains the advantages of studying migrant fertility in the UK. The final section of the introduction (1.5) then describes the structure of the rest of the thesis, including an overview of how the papers link together to form a collective contribution.

1.1 What is migrant fertility?

This thesis is a demographic study of migrant fertility. More specifically, it studies the childbearing of international migrants and their descendants. With reference to prior research, in particular research on migrant fertility differentials in high income countries, it endeavours to make a series of contributions and develop new knowledge about migrant fertility behaviour. Before doing this we might ask: *What is migrant fertility? And how is it defined in this thesis?*

The study of migrant fertility represents the intersection of two significant fields of research. These are fertility research, where fertility is the term used by demographers to refer to childbearing, and migration research, where migration can be defined in different ways, as discussed in the paragraphs below. Each of these research fields have been of enduring interest to demographers, since at least the time of Malthus (Bonar, 1966; Cassedy, 1969; Malthus, 1798), and this remains the case today (Hirschman & Tolnay, 2005; Micklin & Poston Jr, 2005). Fertility and migration combine with mortality to form the “*the triumvirate that determines the size of any population*” (Brown & Bean, 2005, p. 347). They are the core concerns of demography (Hinde, 1998; Newell, 1993; Preston, Heuveline, & Guillot, 2000), not least because they provide essential information about population dynamics and population trends (Dyson, 2010; Finney & Simpson, 2009; Livi-Bacci, 2012; Lutz, 2013; Stillwell, 2011). This information is essential because it is used by a variety of decision-making organisations, including governments and international agencies. For example, research on international migration, and research on fertility, is used to inform policy decisions that impact millions of people, including national population policies and internationally co-ordinated policy interventions relating to economic and development goals (Kantorová, Biddlecom, & Newby, 2014; Skeldon, 2013; UN, 2013a, 2013c, 2014).

Given that it represents the intersection between these fields, the reasons for studying migrant fertility overlap with the reasons for studying either fertility or migration. For example, studies of migrant fertility can demonstrate how migrant behaviour impacts a destination society, or how living in a destination society can impact the lives of migrants. These two motives are common in the field of migration research, not only for demographers but also for other social scientists. Alternatively, studies of migrant fertility can help to explain differences in fertility between populations, or help to predict how fertility patterns are likely to impact future population size and composition. These two motives are common in the field of fertility research, especially for demographers.

Studies of migrant fertility cover a wide range of topics and research questions, and one way to distinguish between topics is by the type of migrant that is investigated. For example, studies of migrant fertility usually focus on either internal or international migrants. This thesis does not refer to the fertility of internal migrants, unless otherwise stated, although some research on internal migrants is referenced when discussing theories and hypotheses. Instead, it focuses on the childbearing behaviour of international migrants and their descendants. As shown in table 1.1, migrants are therefore defined throughout this thesis according to their country of birth, parental country of birth, and age at migration. This is consistent with the majority of research on the fertility of immigrants and their descendants, and allows migrants to be classified according to their 'generation' (e.g. Bélanger & Gilbert, 2006; Frank & Heuveline, 2005; Parrado & Morgan, 2008). Migrant generations are usually ranked, as in table 1.1, according to their 'exposure to destination culture', where first generation adult migrants are the least exposed. However, it is very rare for all generations to be considered in any one piece of research. For example, child and adult migrants are often combined and analysed as the foreign-born, and the second generation (including generation 2.5) are frequently grouped together with ancestral natives and analysed as the 'native-born' (Sobotka 2008).

Table 1.1: Definitions of different migrant generations

Detailed Generation	Aggregate generation	Place of birth	Age at migration ³	Parent's place of birth
Ancestral natives ¹	Third	Native-born		Both native-born
Generation 2.5	Second	Native-born		One foreign-born
Second generation	Second	Native-born		Both foreign-born
Child migrants ²	First	Foreign-born	Under 16	
Adult migrants	First	Foreign-born	16 and over	

1: Ancestral natives are sometimes called the 'third-or-more' generation; 2: Child migrants are sometimes referred to as the 1.5 generation; 3: The age at migration threshold that is used to define child migrants can vary (e.g. 10 rather than 16)

It is perhaps worth noting that these definitions are preferred to alternative definitions based on ethnicity or intention-to-stay (UN, 1998). One of the main reasons for this is that definitions based on country of birth are more stable over time, more closely related to ancestry, and are far less susceptible to either subjective changes in identity (compared with ethnicity), or changes in immigration status due to repeat migration (compared with immigration flows). For example, ethnicity and national identity are multi-dimensional, self-reported, and socially constructed, which means they may change over an individual's life-course (Aspinall, 2009; Burton, Nandi, & Platt, 2010; Mateos, Singleton, & Longley, 2009; Voas, 2009). Indeed, these changes may also be associated with integration and assimilation, thereby implying that they are simultaneous to the processes of migration and fertility (Burton et al., 2010; Yinger, 1981).

The term migrant, as used here, may therefore refer to first generation (foreign-born) immigrants whose migration may have occurred any number of years in the past, or to the second generation, who are born in a given destination country, but who have at least one foreign-born parent. The term fertility, as mentioned already, is used throughout this thesis to refer to childbearing, for example the number and timing of births. In addition, as is

almost always the case in the demographic literature on fertility, only births to women are studied here. Given all of these definitions, and unless otherwise stated, the term 'migrant fertility' in this thesis generally refers to the childbearing of women who are first generation migrants or members of the second generation, although alternative groups (e.g. the third generation) are sometimes discussed.

1.2 Why study migrant fertility?

Before reviewing the empirical literature, it is useful to establish why demographers study migrant fertility, not least because this shows the value of past and future research. Section 1.4 describes why it is beneficial to study migrant fertility in the UK, which is the context for the empirical research in this thesis. But this section considers demographers' broader motivations, and introduces the most prominent reasons for studying migrant fertility.

As described in the literature review (section 1.3), migrant fertility has been the subject of a considerable number of research articles, from the end of the 19th Century until the present day. Although, much of the earliest research focuses on the US context, an increasing number of high income countries have been studied since the middle of the 20th Century. Demographers have been interested in studying these contexts for a variety of reasons. To help the discussion here, these motivations can be divided into two broad aims, which are: (1) to understand the impact that migrant fertility has on a destination, and (2) to understand the determinants of migrant fertility behaviour and the impact that destinations have on migrants and their fertility. Although there may be some exceptions, the most prominent motivations for demographers to study the childbearing of immigrants and their descendants can be placed in one of these two categories.

1.2.1 Understanding the impact of migrant fertility on destinations

There are several reasons why demographers may want to know how migrant fertility impacts a destination. Migrant fertility has the potential to influence destination fertility trends in a variety of ways, especially if the migrant population is sizeable and their fertility is different from the autochthonous native population (i.e. if migrant fertility differentials exist). For example, migrant fertility may have a direct impact on destination population size if migrants give birth to either larger or smaller numbers of children. Migrant fertility may also have an impact on population composition, including population age structure. This may be due to differences between the timing of migrant and native births, even when migrants give birth to the same number of children as natives.

The fact that some nations worry about population size is hardly a new phenomenon (Demeny, 2011; Finkle & McIntosh, 1994). Since the mid-1970s, the UN has gathered data on population policies, which gives an indication of contemporary national concerns about population size and composition (UN, 2013b, 2015). These data cover separate topics (including population size and growth, population age structure, fertility, and international migration), and they show considerable variation among countries. Nevertheless, there are a common set of inter-related concerns that have emerged for the majority of high income countries. The most prominent of these concerns relate to population ageing and below replacement fertility (Grant et al., 2004). In 2013, 92% of the governments of higher income countries (the ‘more developed regions’) considered population ageing as a major concern (UN, 2013b). In the same year, 49% of these countries had policies to raise their rate of population growth, as compared with 23% in 1996 (UN, 2013b). These UN statistics are not unrelated. The policy implications of population ageing are well documented (e.g. Christensen, Doblhammer, Rau, & Vaupel, 2009; Harper & Hamblin, 2014; Lee & Mason, 2010), and include the impact of ageing on labour supply, old-age

support ratios, and pensions, all of which is driven by decreases in the proportion of the population that is of working age (Grant et al., 2004). One way to mitigate these problems is to encourage population growth, in particular growth that will either reduce dependency ratios or offset low fertility. This may explain why many governments of high income countries have been happy to experience (or have actively encouraged) increases in either international migration or fertility. As mentioned, migrant fertility is relevant to both of these changes because it falls at the intersection between the two.

Although it might bring benefits for ageing societies, there are problems associated with trying to encourage this kind of population growth. Although it might be possible to increase migration, there may be negative impacts of migration on society, including the resources that are required to accommodate new migrants and their families, alongside problems relating to integration and social cohesion (Haug, Compton, & Courbage, 2002). These issues apply to many socio-demographic aspects of migrant behaviour, including migrant fertility (Kulu & González-Ferrer, 2014), and they are discussed in more detail below in relation to assimilation.

For population growth driven by fertility, governments and policy-makers face additional problems because it is difficult for them to stimulate increases in childbearing. Policies to promote fertility are hard to evaluate, but evidence of their effectiveness is at best ambiguous, and it is hard to predict whether any single policy (in isolation) will be able to increase national birth rates (Hoem, 2008; Neyer & Andersson, 2008). Considered in this light, migrant fertility differentials might be considered an additional benefit of migration, and migration might be seen (by some) as a more reliable means of increasing destination fertility rates than other policy options. Nonetheless, this depends on whether migrants and their descendants have larger families than natives. It is therefore important to understand migrant fertility differentials, and the extent to which they reduce in magnitude (i.e. converge) across subsequent generations. If migrant fertility has already converged with natives by the

second generation, then any impact of migration on destination fertility will last for only one generation, and therefore require new immigrants in order for it to be sustained. Of course, if migrant fertility differentials are instead perceived as negative, then the convergence of migrant fertility might be seen as a more positive outcome. For instance, this might be the case in contexts where population growth is desirable, but migrant fertility is lower than native fertility, thereby preventing growth.

Beyond their impact on population size and age structure, migrant fertility differentials may have other affects on a destination. For example, migrant fertility might impact destinations via life course decisions that are related to fertility behaviour. The timing of migrant births may interfere with education and training, or prevent migrant women from entering the labour market. In turn, this might have implications for levels of education and skills, not only for the destination society, but also for the migrants themselves and their life course opportunities. To consider another example, although births to teenage migrants may in some contexts provide benefits to society with respect to increased population size, teenage childbearing may also have repercussions for the lives of migrants, similar to the policy issues associated with early motherhood in general (Hobcraft & Kiernan, 2001). In fact, migrant fertility may have an impact on many different socio-demographic processes, especially in the long-run via the descendants of migrants. For example, migrant fertility differentials will impact the future composition of the population and the marriage markets of future generations, particularly for the migrant characteristics that are more prevalent like ethnic minority status.

1.2.2 Understanding the determinants of migrant fertility

In addition to their attempts to understand the impact of migrant fertility on destinations, demographers also study migrant fertility in order to understand the determinants of migrant fertility. This includes efforts to understand how

living in a destination impacts migrant fertility, which often relates to an interest in assimilation theory or the demographic transition.

When studying migrant fertility and assimilation, demographers usually investigate the predictions of assimilation theory by examining whether migrant fertility converges towards a destination's fertility norm (Bean, Cullen, Stephen, & Swicegood, 1984; Milewski, 2011; Parrado & Morgan, 2008; Scott & Stanfors, 2011). In doing so, they may also be motivated to understand a range of concepts that are associated with assimilation, including adaptation, integration and socialisation (Coleman, 1994; Hervitz, 1985; Kulu & González-Ferrer, 2014; Parrado & Morgan, 2008). Often this means that they have the same motivations as researchers who study the assimilation of other behaviours. Migration scholars have studied assimilation with respect to a variety of socio-demographic outcomes, and these include: language, residential segregation, political participation, education, wages, social mobility, family structure, intermarriage and fertility (Alba & Nee, 2005; Crul & Vermeulen, 2003; Heath, Rethon, & Kilpi, 2008; Massey, 1981; Smith, 2003, 2006; Waters & Jiménez, 2005). One of the main drivers of assimilation research has been concerns about the social problems that might arise if migrants fail to assimilate, including their possible marginalisation (Alba & Nee, 2005; Brubaker, 2001; Parekh, 2000; Rudmin, 2003). Similarly, there have been concerns about the links between failed assimilation and social disadvantage (Portes & Rumbaut, 2001; Portes & Zhou, 1993; Rumbaut & Portes, 2001). Migrant fertility is an important aspect of the lives of migrants, and is an important part of assimilation research, not least because fertility is associated with many other social processes, including partnership, education, and employment (e.g. Andersson & Scott, 2005; Milewski, 2010a). This may explain why some research has tried to evaluate migrant fertility convergence in relation to other assimilation outcomes like language or community population composition (e.g. Adserà & Ferrer, 2011; L. E. Hill & Johnson, 2004).

As well as assimilation, demographers have studied the impact of destinations on migrant fertility in order to understand the demographic transition (e.g. Coleman, 1994). This is almost always motivated by an interest in the fertility transition, which refers to the fall in fertility rates that is predicted to occur in all countries by demographic transition theory (Dyson, 2010). This prediction is relevant to immigrants, in particular for those from high fertility origins, because their origin and destination may be at different stages of the demographic transition. If immigrants have moved from a pre-transitional or mid-transitional society to a post-transitional society then the common expectation is that their fertility decline will be accelerated by their new environment (Coleman, 1994).

It follows that a destination may impact migrant fertility through a process of assimilation or by an acceleration of the demographic transition. But these are not the only factors that can impact migrant fertility, especially for first generation migrants because their childbearing might be influenced by factors that are linked to their migration. Researchers have often been motivated to study the links between fertility behaviour and the timing of migration. In doing so, they have developed a range of hypotheses and explanations, including: disruption, selection, reverse causality, anticipation, elevated fertility, legitimacy, and family formation (Andersson, 2004; Goldstein & Goldstein, 1983; Harbison & Weishaar, 1981; Hervitz, 1985; Milewski, 2010a; Toulemon, 2006). These are discussed in the literature review (see section 1.3 & table 1.2), and it is sufficient to note here that the aim of studying these hypotheses is to explain migrant fertility behaviour, sometimes alongside other explanations like assimilation.

In fact, demographers might be motivated to study any of the determinants of migrant fertility, especially through their broader interest in explaining and predicting fertility. This might be at either the micro or the macro level (Billari, 2015). At the macro level, they may be interested to study how the characteristics of migrants have an impact on destination fertility levels

and population change. This includes an interest in the changing composition of the migrant population, and how it impacts destination fertility via the childbearing of migrants (Jonsson & Rendall, 2004). At the individual-level, demographers may be more curious to investigate whether the socio-demographic characteristics of migrants can provide an explanation for their different fertility behaviour, either in comparison to other migrants, or in comparison to the native-born population. This explanation has sometimes been referred to as the 'characteristics' or 'social characteristics' hypothesis (Goldscheider & Uhlenberg, 1969; Milewski, 2010a).

Of the remaining motivations for studying the determinants of migrant fertility, the most common is to understand the role of culture as a determinant. In general, demographers have considered culture as an explanation for fertility variation in a variety of research contexts (Bachrach, 2013; Davis & Blake, 1956; Gjerde & McCants, 1995; Hammel, 1990; Kertzer, 1997; Lorimer, 1956). Moreover, culture lies at the core of many theories of migrant fertility, including the hypotheses of minority status, childhood socialisation, and cultural entrenchment (or cultural maintenance) (Abbasi-Shavazi & McDonald, 2000; Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969; Hervitz, 1985; L. E. Hill & Johnson, 2004). In addition, many of the explanations for assimilation relate to culture, as is made clear by the literature on acculturation (Berry, 1997, 2005; Rudmin, 2003; Schwartz, Unger, Zamboanga, & Szapocznik, 2010). For many migrants, culture is a mediator in the relationship between their ancestral origins and the destination society, and this suggests another reason why the study of migrant fertility is important. The childbearing of one migrant generation produces the next generation, and each of these generations may have links to their ancestral origin culture and the destination culture, for example through factors like identity, ethnicity, and community norms. Studies of migrant fertility cast light upon these factors, and the relationships between origin culture, destination culture, and the life course of migrants.

1.3 The empirical literature on migrant fertility, differentials, and convergence

The empirical literature on migrant fertility has described and investigated the fertility of immigrants and their descendants in a variety of contexts. Researchers have made use of a range of data sources, a variety of fertility measures, and a considerable array of statistical methods. This section carries out a brief review of the literature, which is used to introduce and establish the contribution of this thesis. Although several authors have carried out reviews of research on migrant fertility (Forste & Tienda, 1996; Genereux, 2007; Kulu & González-Ferrer, 2014; Milewski, 2010a; Zarate & Zarate, 1975), none of these suggest a definitive way to organise the literature. This review is therefore organised into three subsections. It begins with a review of research on migrant fertility differentials, with a focus on how migrant fertility is measured. The next two subsections then review research that has used these differentials to investigate migrant fertility convergence and the factors that determine migrant fertility.

1.3.1 Research on migrant fertility differentials

Irrespective of its aims, previous research on the fertility of immigrants and their descendants has almost always sought to compare members of a migrant population with members of a destination population (Forste & Tienda, 1996; Milewski, 2010a). Although these groups are defined in different ways, the majority of research compares the fertility of first generation immigrants with the fertility of native-born members of the destination, sometimes by examining immigrants separately according to their country of origin (Kulu & González-Ferrer, 2014; Milewski, 2010a; Parrado, 2011; Sobotka, 2008). In some cases, comparisons also include the descendants of migrants, often analysed separately as child migrants or the second generation (Adserà et al., 2012; Parrado & Morgan, 2008).

Although the differences between migrant and native fertility are not always calculated, these two groups are usually compared and contrasted, and the differences in their fertility are commonly referred to as migrant fertility differentials. It is typical for differentials to be analysed using a measure that represents the average number of children born for a given age or range of ages (Haug et al., 2002; Milewski, 2010a; Parrado, 2011; Sobotka, 2008), although differentials can be analysed using other measures of fertility including those that measure birth rates or the timing of births (Carlson, 1985; Milewski, 2007; Østby, 2002).

The fertility of immigrants and their descendants is most often studied in high income countries, where fertility is comparatively low and the first demographic transition is usually assumed to have ended (Milewski, 2010a). This means that researchers most often focus their attention on migrants from origin countries that have higher fertility than the destination, for example Mexican immigrants to the US (Parrado & Morgan, 2008) or South Asian immigrants to the UK (Dubuc, 2012). Similarly, they are most often interested in identifying the magnitude of 'positive' differentials, where positive implies that migrant fertility is higher than that of natives. As discussed in section 1.2, the size of migrant fertility differentials is of interest to researchers who are aiming to understand the contribution of migrants to a destination's population dynamics. As discussed later in this review, differentials are also used by researchers when analysing migrant fertility convergence or investigating the determinants of migrant fertility.

Studies of migrant fertility differentials have a long history. The earliest known study considers the fertility of migrants in France, and was published more than 120 years ago (Dumont, 1894). After this, almost all of the earliest research examines differentials in the US. Initially, this US research focused on cities and states, including New York City (Claghorn, 1901), Massachusetts (Dumont, 1897; Kuczynski, 1901, 1902), and New England (Spengler, 1930). Not long after this, US research began to develop a nationally representative picture

of differentials (Carpenter, 1927; Gillette, 1926; Spengler, 1931, 1931), which even included some knowledge of differentials for the second generation (J. A. Hill, 1913). The results of this research have been summarised recently, with the conclusion that:

“By the beginning of the 20th Century, Americans already knew that immigrant fertility was higher than that of the native born, that there was fertility variation among immigrant groups, and that the fertility of the immigrant second generation was lower than that of the first generation (Watkins, 1994)” (Glusker, 2003, p. 1).

Since these early studies of the US, researchers have established evidence of differentials in a large number of national settings (Milewski, 2010a). Recent research on the fertility of international migrants suggests that differentials exist in most of the high income countries of Europe (Coleman, 1994; Haug et al., 2002; Sobotka, 2008), North America (Adserà & Ferrer, 2014b; Frank & Heuveline, 2005; Parrado, 2011), and Oceania (Abbasi-Shavazi & McDonald, 2000; Statistics New Zealand, 2012). However, when reviewing the literature, it is apparent that this general statement depends upon both the migrant group that is considered and the way in which fertility is measured, each of which is discussed below.

Much of what is known about descriptive patterns of migrant fertility at the national level is based on Total Period Fertility Rates (period TFRs) (e.g. Sobotka, 2008). The period TFR is usually interpreted as the average number of children born per woman, but it is defined as the average number of children that a group of women would have if they experienced the age-specific fertility rates for a particular period across their entire reproductive life course (Hinde, 1998; Kuczynski, 1932). It is often referred to as a period measure of fertility because it is based on the births that occur in a population in a given period, which is often an individual year.

The period TFR is easy to calculate because it does not require information on fertility history, either at the individual or the population level.

Also, there is no difference in the definition of the period TFR when it is calculated for migrants (e.g. Zumpe, Dormon, & Jefferies, 2012). These attributes of the period TFR may explain why it has become one of the most frequently used measures for estimating and evaluating migrant fertility differentials, especially by the national statistics agencies who supply official statistics to government, and the policy-makers who seek to evaluate timely statistics on migrant fertility differentials (Garssen & Nicolaas, 2008; Østby, 2002; Sobotka, 2008; Sobotka & Lutz, 2011; Toulemon, 2004; Tromans, Natamba, & Jefferies, 2007).

However, although the period TFR is frequently used to compare the number of children born in two populations or subpopulations, it is well known that comparisons can be distorted by differences between these populations in their timing of births (Hajnal, 1947; Ní Bhrolcháin, 1992, 2011). This issue may be particularly problematic for studies of migrant fertility differentials, where the timing of migrant births is known to relate to the timing of migration (e.g. Murphy, 1995; Singley & Landale, 1998; Toulemon & Mazuy, 2004). In addition, and unless it is adjusted, the period TFR only considers births that occur in the destination (Toulemon, 2004). If immigrant birth risks are elevated after arrival, as has often been observed, then this may lead to an overestimate of differentials based on period TFRs (Parrado, 2011; Toulemon, 2004, 2006; Toulemon & Mazuy, 2004). This suggests that the period TFR may not be a reliable measure for the estimation and evaluation of differentials, in particular for first generation immigrants. This is a particular concern in contexts like the UK, where almost all research on the fertility of immigrants and their descendants has been based on the analysis of period TFRs (see section 1.4).

In addition to concerns about the period TFR, this discussion highlights the need to be critical of the data and methods that are used to calculate migrant fertility differentials. An important consideration here is the fact that most migrant fertility research uses samples that include women who have yet

to complete their childbearing. This is potentially problematic for research on differentials because evidence of differences between the number of children born to migrants and natives may be confounded by differences in birth timing and the age composition of the sample. This issue can be potentially problematic even when age is 'controlled for', and remains relevant irrespective of the statistical methods that are used to estimate differentials. Unless completed fertility is analysed, large differentials in the average number of children born may be due to the fact that both groups have yet to finish childbearing. On the other hand, differentials in completed fertility may be accompanied by the absence of differentials at early stages of the life course for some migrant groups.

Of course, this issue may not always be relevant. For example, the analysis of samples of women who have completed childbearing will be far less relevant when analysing differentials in first birth timing. It is therefore important to note that the implications of calculating differentials using women whose childbearing is not complete will depend on the aims of researchers and the inferences that they hope to make.

Nevertheless, this discussion highlights several potential gaps in the literature. Firstly, it suggests a need for more research that calculates migrant fertility differentials for women who have completed their childbearing. At present, there are only a handful of studies that have calculated differentials in completed fertility (e.g. number of children born at age 40), and most of them have focused on the US (Goldstein & Goldscheider, 1968; Mayer & Riphahn, 2000; Parrado, 2011; Parrado & Morgan, 2008; Rosenwaike, 1973; Young, 1991). This is a particularly important gap in the literature given the number of research aims (outlined in section 1.2) that imply an interest in completed fertility. For example, completed fertility differentials are essential for evaluating the lifetime contribution of migrants to population size, as compared to natives.

In addition to this lack of research on completed fertility, there is a lack of research that analyses differentials using completed fertility profiles. There are some studies that have analysed the completed and partially completed fertility profiles of first generation migrants (e.g. Alders, 2000; Bagavos, Tsimbos, & Verropoulou, 2007; Fokkema, de Valk, de Beer, & Van Duin, 2008; Friedlander & Goldscheider, 1978; Garssen & Nicolaas, 2008). However, these studies do not include an explicit comparison of differentials over the life course for women who have reached the end of their childbearing. This is an important gap in research because the analysis of completed fertility profiles can show how differentials vary over the entire reproductive life course, rather than just a particular stage. Among other things, this knowledge can show the life course stages where differentials are largest. It can also help researchers to choose the most suitable sample or most appropriate measure of fertility for future analysis. This may be particularly important when researchers are limited by the data that are available. For instance, if differentials are constant over the life course, then completed fertility differentials can be approximated by calculating differentials at any age, including using samples of women who have yet to complete their childbearing. On the other hand, if differentials fluctuate over the life course, then this suggests researchers may need to be cautious when interpreting differentials, especially when making inferences beyond the samples or measures that they use.

Another reason to be cautious when interpreting differentials is the fact that differentials often vary by migrant group. In particular, there is evidence of substantial variation in migrant fertility differentials for different origin groups across a range of different destinations (e.g. Adserà & Ferrer, 2014b; Alders, 2000; Blau, 1991; Coleman, 1994; Haug et al., 2002; Kahn, 1988, 1994; Sigle-Rushton, 2008; Sobotka, 2008; Young, 1991). This implies that the analysis of aggregate differentials, for example for all first generation women, may mask important variation by origin. It also implies that variation by origin may be very important to consider in research that makes use of differentials, including research on convergence.

1.3.2 Research on migrant fertility convergence

Studies of migrant fertility convergence are most closely associated with efforts to understand the impact of a destination on migrant fertility. For the reasons outlined below, migrant fertility convergence is hard to define, not least because it appears to be used in different ways by different researchers. However, in general the concept of convergence refers to a gradual narrowing of differences over time, so when applied to migrant fertility this is usually taken to mean a narrowing of migrant fertility differentials over time. It is for this reason that research on migrant fertility convergence can be seen as building upon research on migrant fertility differentials.

On the one hand, migrant fertility convergence can be seen as a descriptive phenomenon, in the sense that it describes relative changes in migrant fertility behaviour. But on the other hand, convergence can also be seen as an explanation for migrant fertility. For example, if second generation fertility is the same as native fertility then this might be explained by convergence. Of course, researchers may then ask why fertility has converged, and explanations for different types of convergence are discussed in the next subsection (1.3.3).

Although convergence is not itself a theory, it is often predicted by theories. As discussed in section 1.2, the convergence of migrant fertility is predicted by assimilation theory, which explains why an interest in assimilation is one of the most common motivations for studying convergence (Parrado & Morgan, 2008; Stephen & Bean, 1992). However, convergence is also studied by researchers who have other interests. This includes those with an interest in the determinants of migrant fertility, and those with an interest in the contribution that migrants make to population change (Coleman, 1994; Sobotka, 2008).

Irrespective of their motivations, researchers have used differentials to describe patterns of migrant fertility convergence in a range of different contexts (e.g. Andersson, 2004; Bélanger & Gilbert, 2006; Blau, Kahn, Liu, &

Papps, 2013; Dubuc, 2012; Frank & Heuveline, 2005; Garssen & Nicolaas, 2008; Milewski, 2010a, 2010b; Mussino, Iaccarino, Prati, & Strozza, 2010; Nahmias, 2004; Parrado & Morgan, 2008; Scott & Stanfors, 2011; Woldemicael & Beaujot, 2012). Based on the conclusions of these studies, it appears that there is some evidence of convergence, for some groups of migrants. However, it is difficult to summarise the findings of this research, particularly because the concept of convergence has been used by researchers in many different and contradictory ways.

As mentioned, migrant fertility convergence is often seen as a prediction of intergenerational assimilation. For instance: *“a process of gradual acculturation to the fertility norms and values of the destination society is posited to occur from generation to generation”* (Stephen & Bean, 1992, p. 69). Most evidence of this type of convergence relates to the US context. Yet despite focussing on the same context, it seems that conclusions about convergence differ according to the way that it is defined, and the chosen method of analysis (Parrado & Morgan, 2008).

In contrast to the prediction of assimilation, convergence has also been proposed as a prediction of demographic transition theory such that: *“convergence with the demographic regime of the host society will take place, much faster than if the migrants had remained in the country of origin”* (Coleman, 1994, p. 110). There is less research on this type of convergence, but Coleman finds evidence that it has occurred across a range of destinations in Western Europe (1994), in particular for European immigrants. In another example, Dubuc suggests that the falling period TFRs of Indian immigrants in the UK *“partly reflects the progress of the demographic transition in India”* (2012, p. 361).

In addition to these two types of convergence, some authors have proposed that convergence can be predicted, variously, by the hypotheses of adaptation, socialisation, or selection (defined in more detail in subsection 1.3.3) (Kahn, 1994; Milewski, 2007, 2010a). In the case of adaptation, some researchers propose that it predicts convergence over the life course for first generation

immigrants (Hervitz, 1985; Stephen & Bean, 1992), while others have used the concept to refer to convergence over generations, similar to the prediction of intergenerational assimilation (Abbasi-Shavazi & McDonald, 2000).

Across the literature on migrant fertility, it seems that the concept of convergence is often discussed, or alluded to, without making reference to these varied and ambiguous meanings. This often makes it hard to interpret individual pieces of research, and almost certainly makes it difficult to compare and contrast different studies, especially in order to summarise the literature. In rare cases, research has alluded to the fact that convergence may have multiple meanings, for example by suggesting that assimilation can either occur among immigrants or across generations (e.g. Parrado & Morgan, 2008). However, research has yet to make this diversity of meanings explicit, or to explore the ramifications of different convergence definitions for studies of migrant fertility. Even when it is crudely defined, for example as the narrowing of migrant fertility differentials over time, definitions of convergence almost always retain a number of important ambiguities. For instance, they rarely make clear which migrant groups are being referred to, who is the comparison group for convergence, and which aspect of fertility is expected to converge.

Considering all this, it is perhaps not surprising to find contradictions in the literature. For example, research on Western Europe that was carried out in the 1990s states that: *"convergence with the fertility of the host society has been achieved by almost all Mediterranean populations"* (Coleman, 1994, p. 122). And yet, fourteen years later, a study of migrant fertility in Europe states that: *"a case of a complete convergence has not thus far been recorded"* (Sobotka, 2008, p. 231). Of course, this contradiction might be explained by different definitions of convergence. However, as with the rest of the literature, the authors do not appear to acknowledge the distinctions between different types of convergence. This suggests that there is a need for researchers to be clear about what is meant by convergence, both when designing and interpreting empirical research.

Given that convergence depends upon an assessment of migrant fertility differentials, many of the gaps in the literature on convergence also relate to the gaps in research on migrant fertility differentials. For example, research on the reliability of period TFRs for estimating migrant fertility differentials may be relevant for some studies of convergence (Parrado, 2011; Toulemon, 2004, 2006; Toulemon & Mazuy, 2004). Convergence has often been analysed using TFR differentials (e.g. Dubuc, 2012), or differences in birth timing (e.g. Milewski, 2010a, 2010b). However, there has been very little research that has investigated the convergence of completed fertility or completed fertility profiles. One exception is a small body of research on generational convergence, which finds evidence of completed fertility convergence for some migrant origins (e.g. Goldstein & Goldscheider, 1968; Parrado & Morgan, 2008; Rosenwaike, 1973; Young, 1991). However, as with research on completed fertility differentials, almost all of this considers migrant fertility in the US.

1.3.3 Research on the factors that determine migrant fertility

In addition to describing patterns of differentials, researchers often try to explain these patterns, usually by exploring the variation in fertility that is observed among migrant groups. Researchers have carried out a number of studies that aim to establish the determinants of migrant fertility behaviour. Moreover, the scale of this activity is reflected by the number of hypotheses that have been proposed and developed. These hypotheses are reviewed in detail elsewhere (Milewski, 2010a), and can be grouped in a variety of different ways. But to emphasise one important difference between them, they are grouped here into those that make predictions about the fertility of immigrants only (table 1.2), and those that make predictions for both immigrants and their descendants (table 1.3).

Table 1.2: Hypotheses and explanations for first generation fertility

Hypothesis / explanation	Adult migrants ¹	Child migrants ¹	Later generations
Disruption	Interruption of fertility before or after migration, followed by a recovery of childbearing to previous or higher levels	Limited effect as long as migration is before childbearing begins	No prediction
Anticipation ²	Usually suggests a postponement of fertility until after migration, although some have suggested that women may seek to expedite births prior to migration	Limited effect as long as migration is before childbearing begins	No prediction
Elevated fertility ²	Increase in fertility shortly after migration	Limited effect as long as migration is before childbearing begins	No prediction
Family formation / Inter-relation of events	Depends on other events, in particular partnership, and is usually predicted to affect birth timing	Limited effect as long as migration is before childbearing begins	No prediction
Selection	Immigrants are different from the population at origin, and this may affect all aspects of their fertility	Selection mechanisms will differ, but fertility may be affected	No prediction
Reverse causality	Those intending to migrate are less likely to do so if they have children, thereby leading to a selection of migrants who are more likely to give birth after migration	Limited effect as long as migration is before childbearing begins	No prediction
Legitimacy	Birth timing is driven by desire to obtain citizenship	No prediction	No prediction

1: Adult migrants, as opposed to child migrants, are those whose age at migration is above a given threshold (e.g. 16-years-old); 2: Anticipation and elevation are often described as part of the disruption hypothesis, but they are distinguished here in order to help clarify the distinctions between them.

Table 1.3: Hypotheses with predictions for later generations

Hypothesis / explanation	Adult migrants ¹	Child migrants ¹	Later generations
Adaptation ²	Fertility converges over the life course, presumably due to changes in birth timing	No differences in fertility compared with natives or the native-norm	No differences compared with natives or the native-norm
Inter-generational assimilation ³	Fertility of origin is maintained	Some convergence of one or more aspects of fertility, either the level or timing of births, or both	Convergence across generations until there are no differences compared with natives or the native-norm
Childhood socialisation ³	Fertility of origin is maintained (due to the country context of socialisation)	Convergence likely to be complete, dependent on child environment	Convergence likely to be complete, dependent on child environment
Cultural entrenchment	Fertility of origin is largely maintained	Depends on exposure to origin subculture	Depends on exposure to ancestral origin subculture
Minority group status	Fertility depends upon the status of minority	Fertility depends upon the status of minority	Fertility depends upon the status of minority
Social characteristics	Fertility depends upon the characteristics of the migrant	Fertility depends upon the characteristics of the migrant	Fertility depends upon the characteristics of the descendant

1: Adult migrants, as opposed to child migrants, are those whose age at migration is above a given threshold (e.g. 16-years-old); 2: Adaptation is often referred to as a form of individual convergence or individual assimilation; 3: In some studies it would seem that inter-generational assimilation and childhood socialisation are hard to distinguish, so this table follows the most prevalent use.

There are a range of hypotheses that make predictions about the links between migration and fertility behaviour, including disruption, anticipation, elevated fertility, family formation or inter-relation of events, selection, reverse causality, and legitimacy (Andersson, 2004; Goldstein & Goldstein, 1983; Harbison & Weishaar, 1981; Hervitz, 1985; Milewski, 2010a; Toulemon, 2006). These are shown in table 1.2, alongside their predictions for adult and child migrants. Most of these hypotheses make predictions about fertility shortly before or shortly after migration. As such, they have often been studied by analysing the timing of births, with the aim of understanding how immigrant fertility varies over the life course (e.g. Andersson, 2004; Milewski, 2007, 2010b).

For the purposes of this thesis, which does not set out to isolate and test any of the hypotheses in table 1.2, it may be sufficient to note that there are quite a few studies claiming evidence in support of each of these hypotheses (except for legitimacy, which appears to have only been studied once: Bledsoe, 2004) (Milewski, 2010a). On the other hand, there are only a handful of studies that claim evidence against any of these hypotheses, and this seems to relate exclusively to disruption (Andersson, 2004; Lindstrom & Giorguli Saucedo, 2007; Milewski, 2010b).

The hypotheses in table 1.2 can be contrasted with those in table 1.3, which make predictions about the fertility of both immigrants and their descendants. These include: adaptation, intergenerational assimilation, childhood socialisation, cultural entrenchment, minority group status, and social characteristics (Abbasi-Shavazi & McDonald, 2000; Bean & Swicegood, 1985; Coleman, 1994; Dubuc, 2012; Forste & Tienda, 1996; Kahn, 1994; Milewski, 2010b; Parrado & Morgan, 2008; Rumbaut & Weeks, 1986). With the possible exception of social characteristics, all of these hypotheses are linked to cultural explanations for migrant fertility, and most are linked to the study of convergence. As convergence and culture are both a focus of empirical research in this thesis, these hypotheses are therefore discussed in more detail below.

One of the earliest studies to critically evaluate culture as an explanation for migrant fertility was published in 1969 (Goldscheider & Uhlenberg, 1969). Before this, culture was implicit in some of the concepts used by migrant fertility researchers, like assimilation, but was rarely a focus of research. Goldscheider and Uhlenberg's study marks the beginning of a new period of research, during which the importance of culture was recognised as an explanation for migrant fertility. They criticise previous research for being theoretically limited, especially through its narrow use of the social characteristics hypothesis, and they contrast this with what they call the 'minority group status' hypothesis. This hypothesis predicts that the integration and self-identification of minority groups is more important than their social characteristics for explaining their fertility.

Although some researchers claim to have found evidence in support of the minority group status hypothesis (Bean & Swicegood, 1982, 1985; Lopez & Sabagh, 1978; Ritchey, 1975), recent research has argued that the hypothesis is ambiguous and suffers from a lack of predictive power (Milewski, 2010a). Indeed, it is unclear what minority status predicts for migrant fertility; whether it predicts positive or negative differentials, and whether it refers to birth timing or number of births. For example, migrant groups might limit their fertility in order to improve their social mobility (Forste & Tienda, 1996), or they may maximise their fertility as a way of defending their minority status (Coleman, 1994), and yet both of these predictions appear to fall under the scope of the hypothesis.

Despite the problems of investigating minority group status, culture has become an increasingly prominent explanation for migrant fertility behaviour. In 1996, a conceptual framework for studying the cultural determinants of migrant fertility was proposed by Forste and Tienda (1996). Although this framework was developed with a focus on ethnic fertility differentials, it is equally applicable to the differentials of immigrants and their descendants. In highlighting the importance of culture, these authors state that

the literature on differentials had (at the time they were writing) failed to adequately investigate the cultural determinants of ethnic fertility. Up to this point, research had tried to test a 'cultural hypothesis', predicting that culture is a determinant of fertility differentials (e.g. Bean & Swicegood, 1985). However, despite some indirect evidence in support of this hypothesis, Forste and Tienda state that the literature had yet to clarify the role of culture in explaining fertility differentials, and that new empirical research was required in order to test specific aspects of this role (1996).

Since then, cultural determinants have been investigated by migrant fertility researchers in a number of new ways. For example, research on migrant fertility in Australia has found some evidence in support of a 'cultural maintenance' hypothesis, which predicts that cultural links between migrants and their origin are maintained, and that migrant fertility is therefore determined by the cultural norms of their origin (Abbasi-Shavazi & McDonald, 2002).¹ In general, the last few decades have seen an increasing amount of empirical research that aims to test hypotheses linked to culture, in particular adaptation, intergenerational assimilation, and childhood socialisation (Kulu & González-Ferrer, 2014; Milewski, 2010a). The majority of this research finds some support for the broad conclusion that culture determines migrant fertility. However, as noted by Forste and Tienda in their earlier research, most of these studies take a somewhat remote approach to exploring cultural determinants. This includes research that has investigated culture by examining the links

¹ To avoid confusion with the childhood socialisation hypothesis, in this thesis I refer to a hypothesis of cultural entrenchment (which I have derived from the discussion of culture in Forste & Tienda, 1996). This is somewhat similar to, but subtly different from cultural maintenance. Cultural entrenchment acknowledges the cultural links between origin and destination and predicts that fertility preferences are culturally entrenched, meaning that fertility preferences are maintained after migration via the existence of origin subcultures.

between migrant fertility and origin country fertility rates (Fernández & Fogli, 2006, 2009).

There is however a growing body of research that has investigated the links between culture and migrant fertility more directly. This includes research that has explored the influence of language on migrant fertility (Adserà & Ferrer, 2014a; Bean & Swicegood, 1985; Marin, Gomez, & Hearst, 1993; Sorenson, 1988; Swicegood, Bean, Stephen, & Opitz, 1988). It also includes research that investigates how migrant fertility is associated with exposure to cultural norms (Abma & Krivo, 1991; Fischer & Marcum, 1984; Gurak, 1980; L. E. Hill & Johnson, 2004; Lopez & Sabagh, 1978). Compared with the rest of the literature, these studies come much closer to investigating the direct links between culture and migrant fertility. The main problem with these studies is that they are very hard to interpret. These issues are discussed further in chapter 5, so it may be sufficient to note here that these studies almost always measure culture simultaneously with fertility, thereby making it very hard to say whether culture is determining fertility or fertility is determining culture.

In reviewing the literature, there is an evident need for more research that explores the cultural determinants of migrant fertility. New research on this topic would also have relevance for the broader understanding of culture in demography (Bachrach, 2013). In the broader context, migrants are useful to study because they typically display a large amount of cultural variation, both within and across groups, as well as in comparison with natives. First generation migrants, especially those who migrate as adults, are likely to be exposed to at least two different cultures over their life course, the cultures of origin and destination.

As migrants spend more time in a destination, it is usually assumed that their fertility will converge with the native fertility norm, either because of cultural or socio-economic assimilation. This is the most common prediction of adaptation. For the descendants of migrants, it is typically expected that the destination culture will be more influential in determining their fertility than

the culture of their ancestral origins. This is the assumption behind intergenerational assimilation and childhood socialisation, both of which predict a convergence of migrant fertility over generations. But there is also the possibility that migrant fertility might not converge. For example, the fertility of a migrant group may become culturally entrenched due to the influence of origin subcultures. This remains an important counterpoint, and a competing explanation for the links between origin, destination and convergence.

1.4 The context for the empirical research in this thesis: migrant fertility in the UK

Having reviewed the literature, and begun to establish some of the needs for new research, this next section describes why it is beneficial to study migrant fertility in the UK, and outlines the context for the empirical research in this thesis.

1.4.1 Why study migrant fertility in the UK?

There are a number of reasons why this thesis focuses on the UK. Perhaps foremost from a policy perspective, is the fact that new knowledge about migrant fertility is required to inform debates about the impacts of migration. Over the last few decades, the UK has experienced unprecedented levels of net migration (ONS, 2015d, 2015e), and this has led to a vigorous debate about migration, which continues to influence politics and policy. The impact of migration has become a key concern for voters, policy-makers, and campaign groups, and the most visible evidence of this is provided by continuous debate in the UK media (e.g. BBC, 2007, 2009, 2012, 2013b, 2014, 2015). The fertility of immigrants and their descendants plays an important part in this debate, and is also widely discussed (Allen & Warrell, 2013; BBC, 2008, 2013a; Easton, 2012, 2013; Hall, 2014; Littlejohn, 2014; Mason, 2012; Sedghi, 2014; The Telegraph, 2010). Despite attracting such wide attention, there are considerable gaps in

knowledge relating to migrant fertility in the UK, and this can be seen by examining previous research.

Table 1.4: Previous research on migrant fertility in the UK

Authors and year	Main data source, method, and focal migrant groups (e.g. by COB ¹)	Main findings relating to migrant fertility
Iliffe, 1978	TFRs ² for first generation by COB from registered births	TFR ² differentials decreased from 1969-1974 for South Asians and West Indians
Coleman, 1994	TFRs for first generation by COB from registered births	TFR differentials decreased from 1971-1990 for South Asians
Murphy, 1995	TFRs for first generation by COB from registered births & LFS ³ (own-child)	TFR differentials existed in 1986 & 1987 for South Asian and Caribbean immigrants
Coleman, Compton, & Salt, 2002	TFRs for first generation by COB from registered births	TFR differentials decreased from 1971-1996, although differentials persist for some (South Asian) COB groups
Tromans et al., 2007	TFRs for first generation from registered births	Proportion of births to foreign-born mothers has increased; TFR differentials exist between UK-born and foreign-born
Sigle-Rushton, 2008	TFRs for first generation by COB from registered births	TFR differentials have decreased from 1981-2001, but persist for some (South Asian) COB groups
Dubuc, 2009	TFRs for first generation by ethnicity from LFS (own-child)	TFR differentials have decreased but variation persists among South Asian ethnic groups
Coleman & Dubuc, 2010	TFRs for first and second generation by ethnicity from LFS (own-child)	TFR differentials have decreased over time for both the first and second generation (and are smaller for the second), suggesting convergence
Dubuc & Haskey, 2010	TFRs for first generation by ethnicity from LFS (own-child)	TFR differentials show convergence of fertility levels across ethnic groups
Wilson, 2011	Birth risks differentials for first and second generation (using count regression)	Second generation birth risks are generally closer to ancestral natives than first generation

1: COB refers to country of birth; 2: TFR refers to the period total fertility rate; 3: LFS refers to the Labour Force Survey

Table 1.4 (continued): Previous research on migrant fertility in the UK

Authors and year	Main data source, method, and focal migrant groups (e.g. by COB ¹)	Main findings relating to migrant fertility
Adserà et al., 2012	Birth risks differentials for child migrants (using count regression)	Adaptation of fertility is more evident for those who spent more of their childhood in England and Wales
Dubuc, 2012	TFRs for first and second generation by ethnicity from LFS (own-child)	TFR differentials have fallen over time for both the first and second generation (and are smaller for the second) due to intergenerational fertility convergence
Robards, 2012	TFRs and birth probabilities for first generation calculated using ONSLS data (census and birth registration)	Birth rates are significantly higher in the first twelve months after arrival before falling to a steady level
Waller, Berrington, & Raymer, 2012	TFRs for first generation by COB from LFS (own-child)	TFRs vary considerably for different COB groups, including Poles and South Asians
Zumpe et al., 2012	TFRs for first generation by COB from registered births	Proportion of births to foreign-born mothers has increased; TFR differentials remain between UK-born and foreign-born (but some evidence of convergence)
Robards, Berrington, & Hinde, 2013	TFRs and average number of births for first generation calculated using ONSLS ⁴ data (census and birth registration)	The recorded fertility of migrants depends upon the way migration is measured
Dormon, 2014	TFRs for first generation by COB from registered births	Proportion of births to foreign-born mothers has increased; TFR differentials remain between UK-born and foreign-born
Waller, Berrington, & Raymer, 2014	TFRs for first generation by COB from LFS (own-child)	TFR differentials negative for Polish migrants, who are less likely than other COB groups to have children soon after arrival

1: COB refers to country of birth; 2: TFR refers to the period total fertility rate; 3: LFS refers to the Labour Force Survey; 4: ONSLS refers to the Office for National Statistics Longitudinal Study

Much of what is currently known about migrant fertility in the UK has been published by the Office for National Statistics (ONS), the national statistics agency for England and Wales, who also produce aggregate statistics for the UK (which is composed of England, Scotland, Wales, and Northern Ireland) (Dormon, 2014; Tromans et al., 2007; Zumpe et al., 2012). Supplementing the work of ONS, the last forty years have also witnessed several waves of academic research investigating different aspects of migrant fertility in the UK (Coleman, 1982, 1994, 2010; Coleman et al., 2002; Coleman & Dubuc, 2010; Dubuc, 2009, 2012; Dubuc & Haskey, 2010; Iliffe, 1978; Murphy, 1995; Robards, Berrington, & Hinde, 2011; Robards et al., 2013; Sigle-Rushton, 2008; Waller et al., 2012, 2014).

Taken together, this research has developed a body of knowledge about migrant fertility in the UK, most of which is based on estimates of immigrant fertility differentials using period Total Fertility Rates (TFRs). A time series of these differentials shows that, on average, differentials have typically represented more than half a child per woman, although there is considerable variation by country of birth (see tables 1.5 and 1.6).

Table 1.5: England and Wales period TFR¹, UK-born compared with foreign-born

Country of birth of mother	2004	2005	2006	2007	2008	2009	2010	2011²
UK-born ³	1.69	1.68	1.76	1.80	1.85	1.85	1.88	1.90
Not UK-born	2.50	2.44	2.42	2.54	2.52	2.48	2.45	2.29
differential	0.81	0.76	0.66	0.74	0.67	0.63	0.57	0.39
Total	1.80	1.79	1.87	1.92	1.98	1.97	2.00	1.98

1: The period TFR (Total Fertility Rate); 2: Figures differ from table 1.6 due to the fact that different data sources are used to estimate the population (for the denominators); 3: Includes England, Wales, Scotland, Northern Ireland, Isle of Man and Channel Islands; Source: ONS statistics on live births in England and Wales in 2012 by parents' country of birth.

Table 1.6: England and Wales period TFR¹ by country of birth of mother

Country of birth of mother	1971	1981	1991	2001	2011 ²
New Commonwealth	4.0	2.9	2.8	2.8	-
India	4.3	3.1	2.5	2.3	2.4
Pakistan & Bangladesh	9.3	6.5	-	-	-
Pakistan	-	-	4.8	4.7	3.8
Bangladesh	-	-	5.3	3.9	3.3
Africa ³	-	-	-	2.4	2.8
East Africa	2.7	2.1	1.9	1.6	-
Rest of Africa ⁴	4.2	3.4	2.7	2.0	-
West Indies	3.4	2.0	1.9	-	-
Rest of New Commonwealth ⁵	-	2.3	1.9	2.2	-
Rest of the World	-	2.0	1.9	2.2	-
UK-born ⁶	2.3	1.7	1.8	1.6	1.8
Not UK-born	-	2.5	2.3	2.2	2.2
differential		0.8	0.5	0.6	0.4
Total	2.4	1.8	1.8	1.6	2.0

1: The period TFR (Total Fertility Rate); 2: Figures will differ from table 1.5 due to the fact that different data sources are used to estimate the population (for the denominators); 3: Excludes countries coded as part of the Middle East; 4: Excludes East Africa, but includes countries listed under Southern Africa and Rest of Africa; 5: Includes countries listed under Far East, Mediterranean, Caribbean and Rest of New Commonwealth; 6: Includes England, Wales, Scotland, Northern Ireland, Isle of Man and Channel Islands; Sources: (Dormon 2014) as well as (Coleman et al. 2002; Sigle-Rushton 2008), who derive their data from “Office for National Statistics Birth Statistics FM1”, Table 9.5 (various years). All of these TFRs are therefore based on annual birth registrations and census population estimates.

Unfortunately, there is no available time series of fertility rates for most origin countries, and table 1.6 shows the most detailed information on TFRs that is available before 2001. Based on this, in each decade since the 1970s it would seem that Pakistanis and Bangladeshis have retained the highest period TFRs compared to other country of birth groups. Overall, foreign-born period TFRs have fallen in the long-run, such that differentials for many groups are now much smaller than they were in the past.

Table 1.5 shows the more recent trend, such that differentials have become slightly smaller in the most recent years, although part of this change is explained by increases in the UK-born period TFR. Not shown in these tables is the fact that there have been large increases in the proportion of births to foreign-born mothers, from 15.3% in 2001 to 24.3% in 2011 (Zumpe et al., 2012). This change is largely attributable to a considerable increase in the size of the foreign-born population between these two census years (ONS, 2013b).

Compared to research on the first generation, it appears that only two previous studies have examined the fertility of the second generation (Coleman & Dubuc, 2010; Dubuc, 2012). In both cases, this has been done by calculating period TFRs for some ethnic minority groups (Black Africans, Indians, and Pakistanis), and then dividing these groups into women who are foreign-born and women who were born in the UK. In both cases, the authors state that they find evidence for the convergence of fertility toward the UK norm. However, they also observe that based on this evidence, convergence *“is not a foregone conclusion, any more than it is among European countries themselves”* (Coleman & Dubuc, 2010, p. 36). Interestingly, both studies suggest that origin country fertility plays a role in explaining migrant period TFR differentials in the UK, perhaps as a manifestation of *“global fertility transitions”* (Dubuc, 2012, p. 358).

Apart from a handful of studies, including the two mentioned in the last paragraph, there appears to be a dearth of research that has considered explanations for migrant fertility in the UK. In one study, Coleman investigates several explanations by comparing trends in period TFRs across Western Europe, including England and Wales (1994). Based on evidence that fertility has fallen over time, he concludes that integration and assimilation are occurring for many immigrant groups, although perhaps not for Africans in England and Wales. More recently, there has been research comparing the fertility of child migrants in England and Wales, Canada and France (Adserà et al., 2012). This study finds evidence in support of the adaptation hypothesis for England and Wales. More specifically, differentials are shown to be negligible for immigrants who arrived shortly after their own birth, but to increase as age at migration increases, thereby suggesting an inverse relationship between the size of differentials and exposure to destination norms. This study has the advantage that the timing of births to child migrants is less likely to be related to the timing of their migration. On the other hand, research on adult migrants in the UK shows that their birth rates are significantly higher in the first twelve months after arrival, after which they fall to a steady level (Robards, 2012), and

research on Polish immigrants appears to confirm this pattern of elevated fertility (Lübke, 2015).

Despite these findings, there is still a need for more research on the UK. If we consider all previous research on the UK, in isolation from research on other countries, then a considerable number of research gaps are apparent. In particular, there has been no research on the completed fertility of immigrants or the descendants of immigrants, including the convergence of completed fertility over migrant generations. There has also been no research that investigates the extent to which immigrant fertility varies over the reproductive life course for different origin groups. In addition, research has yet to investigate the role of culture as a determinant of migrant fertility differentials for different migrant generations. In acknowledging these gaps, it follows that there is a strong case for new research on migrant fertility in the UK.

1.4.2 Broader relevance

In addition to providing new context-specific knowledge, a study of the UK is also of broader interest, and the findings from research on the UK have implications that can be generalised beyond its case. Much of what is known about the fertility of immigrants and their descendants in high income countries is based on research from the US, in particular research on Mexican Americans. However, European immigration has a very different history from North American immigration, and the difference between these two regions is perpetuated by the fact that contemporary immigrants continue to arrive in different quantities from a range of national origins (Livi Bacci, 2012; Manning & Trimmer, 2013; Massey, 2005). For example, the largest US foreign-born population is Mexican Americans, and yet the emigration of Mexicans to countries other than the US is almost negligible (Abel & Sander, 2014). This suggests that findings based on the Mexico-US combination of origin and destination may not be applicable to other high income destinations. For many

research questions, there is a need for research outside the US context in order to consider the extent to which previous findings can be generalised.

In Europe, there has been a growing body of research on migrant fertility (Haug et al., 2002; Kulu & González-Ferrer, 2014; Sobotka, 2008). However, much of this research has been constrained by the data that are available, in particular in its ability to investigate questions relating to completed fertility or completed fertility profiles. Many, if not most, data sources do not have entire fertility histories for women who have completed fertility at the same time as having large enough samples with which to identify groups of immigrants and their descendants by origin or ancestry. In addition, in many high income European countries, a large number of immigrant streams are currently too recent to have produced significant numbers of the descendants of immigrants (e.g. the second generation), in particular with which to study women who have completed their childbearing.

In contrast to a lot of other European countries, the UK does have suitable data to answer the questions that are posed by this thesis. The UK has a long history of migration, which makes it an ideal case for studying the completed fertility and completed fertility profiles of both immigrants and their descendants. In addition, both the first and second generation have a diverse range of origins and ancestries, which allows this thesis to study the heterogeneity of migrant fertility differentials. In doing so, the UK can be considered as a ‘theory-evaluating’ or ‘instrumental’ case study (Mills et al., 2010).

From a broader perspective, and in particular with respect to Europe, research on the UK can contribute to knowledge about migrant fertility in high income countries, and can be used to inform comparative research. Most high income countries in Europe have an interest in the fertility of immigrants and their descendants. As such, many of the findings of this thesis will be relevant outside the UK, even if they demonstrate the difficulties of generalising about migrant fertility across the life course or between different origin groups.

Together with research on other European countries, an analysis of the UK serves not only as a useful comparison, but also contributes to the collective knowledge of a growing European literature. In common with many European countries, the UK has experienced recent increases in migration, and like other high income countries in Western Europe, it also has a growing second generation population (Thomson & Crul, 2007). This growth has led to considerable recent interest in the behaviour of immigrants and their descendants, including their contribution to European societies via demographic outcomes like fertility (Haug et al., 2002). As argued above, knowledge about migrant fertility in the UK can help to inform debates in the UK, but it can also contribute to the same debates in the wider context of European migration. This is particularly important given the fact that most high income countries in Europe continue to experience high levels of immigration (Coleman, 2006; European Commission, 2011; Haug et al., 2002).

1.4.3 An introduction to the broader demographic context: the history of fertility and migration in the UK

Before describing how this thesis contributes to the literature (in the next section, 1.5), this subsection provides some background information about the demography of the UK. This is important because there is limited space in each of the chapters to cover this background in detail.

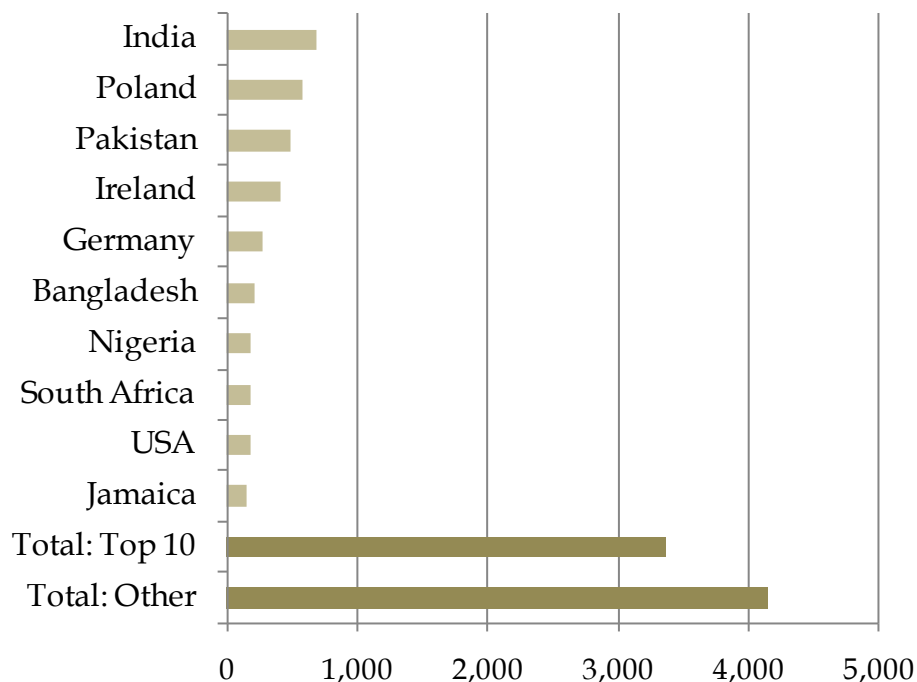
The UK is composed of four constituent countries (note: the figures in brackets show the population of each country as a percentage of the total UK population): England (84%), Scotland (8%), Wales (5%), and Northern Ireland (3%) (ONS, 2014a). Together, the population of these four countries in 2011 was 63 million, and approximately 7.5 million (or 12%) were foreign-born (ONS, 2012, 2014a). The UK is a high income destination with a level of fertility that is slightly below two children per woman (according to both the period TFR in 2011 and the most recent measures of cohort fertility) (Coleman et al., 2002; ONS, 2013a). This means that its fertility is slightly below replacement levels,

where replacement is the level of fertility that a population needs to ensure that it replaces itself in size over the long-run (Smallwood & Chamberlain, 2005). It also means that it has a family size norm which is lower than the origin country norm for some of its largest foreign-born populations, including those from India, Pakistan, Bangladesh, and Nigeria (UN, 2013c). Alongside Poland, these are the five most common countries of birth for births to non-UK born mothers in England and Wales (UK figures are not available) (ONS, 2014e). These five countries are all in the top ten countries of birth by population size, alongside Ireland, Germany, South Africa, the US, and Jamaica (see also figure 1.7) (ONS, 2013b).

As argued in the previous subsection (1.4.2), one reason to study the UK is that, compared to some high income countries, it has a long and sustained history of immigration from a range of different origin countries. The history of immigration to the UK is both nuanced and extensive (e.g. Coleman et al., 2002; Daley, 1998; Foner, 2009; Hornsby-Smith & Dale, 1988; Horsfield, 2005; Murphy, 1995; Peach, 2006; Rendall & Ball, 2004; Rendall & Salt, 2005; Walvin, 1984), and the same is true of UK migration policy (Home Office, 2014). As such, only a brief summary is provided here. The aim is to provide some background for the results in the empirical chapters (3-5), and to focus on the most pertinent information for a contemporary study of migrant fertility in the UK.

Historically, the largest group of immigrants to the UK have come from Ireland, although in the 21st Century they have been replaced by Indians as the largest foreign-born group (figure 1.7) (ONS, 2012). This is perhaps unsurprising given that in 2011 more than 50% of the Irish-born population in England and Wales had arrived before 1970 (figure 1.8). As this statistic suggests, the Irish-born population is also an older population than most other origin groups, and women with Irish ancestry therefore constitute a larger proportion of the second generation population than any other group (see chapter 4).

Figure 1.7: Top ten non-UK countries of birth of usual residents in England and Wales in 2011, (total population in thousands)



Source: 2011 Census, Office for National Statistics.

Although long-established in small numbers, Indian migration began in earnest in the late 1960s and early 1970s (Walvin, 1984). This compares with the inflow of immigrants from Pakistan which reached significant numbers around the mid-1970s, whereas immigration from Bangladesh did not really gather pace until the end of 1970s and early 1980s (Coleman et al., 2002). In general, male migrants were the first to settle in the UK, and family reunification for South Asians began chiefly in the 1980s. In 2011, almost 1.4 million people in England and Wales were lifetime immigrants from one of these three South Asian countries, equivalent to 18% of the foreign-born population. Their respective populations were: 694,000 Indians, 482,000 Pakistanis, and 212,000 Bangladeshis (figure 1.7).

Figure 1.8: Top ten non-UK countries of birth of usual residents in England and Wales in 2011 by year of arrival, (percentage of total by country)

Year of arrival	India	Poland	Pakistan	Ireland	Germany
Before 1961	7	3	2	38	15
1961-1970	16	1	12	19	12
1971-1980	12	1	14	8	13
1981-1990	8	1	13	12	15
1991-2000	11	3	20	8	17
2001-2003	9	6	9	3	5
2004-2006	13	45	12	4	8
2007-2009	14	32	11	5	10
2010-2011	9	9	6	3	5
Total (%)	100	100	100	100	100

Year of arrival	Bangladesh	Nigeria	South Africa	United States	Jamaica
Before 1961	1	1	4	3	20
1961-1970	5	4	4	5	34
1971-1980	13	4	7	6	5
1981-1990	27	13	8	9	5
1991-2000	21	20	26	17	17
2001-2003	9	12	18	8	12
2004-2006	9	19	15	12	2
2007-2009	11	19	13	23	3
2010-2011	4	8	4	15	1
Total (%)	100	100	100	100	100

Source: 2011 Census, Office for National Statistics.

Compared with South Asia, immigration from the Caribbean began earlier in the 20th Century. It was at its peak in the 1950s and 1960s, then fell significantly after the Commonwealth Immigrants Act introduced restrictions on inflows in 1962 (Foner, 2009). Nevertheless, much family reunification occurred after the Act, which led to continued immigration of Caribbean women throughout the 1960s. In 2011, Jamaica was still the 10th largest foreign country of birth in England and Wales by population size (figure 1.8), and a considerable number of first and second generation Caribbeans are resident in the UK.

Three other prominent migrant groups may be worth noting. The first is the 'Old Commonwealth' countries - New Zealand, Australia and Canada - who have a considerable history of settlement in the UK, and have experienced far fewer immigration restrictions than other (New) Commonwealth countries.

The second group of interest is Eastern Europeans, in particular migrants from Poland, which is now the origin country with the second largest foreign-born population in England and Wales (figure 7). Given the focus on completed fertility in this thesis, this group receives less attention here because the majority of Eastern European women in the UK are of childbearing age. For example, more than three-quarters of Polish-born women were aged between 15 and 44 in 2011, and this is associated with the fact that most Polish immigrants arrived after 2004 (figure 8; ONS, 2013b). Despite the recency of most of Eastern European arrivals, this is still an important group to consider in the conclusions of this thesis. This is primarily because, as opposed to many other prominent origins in the UK, Eastern Europe has a lower fertility norm than the UK (UN, 2013b).

The third group of interest is Africans, who represent a very diverse range of origins (Daley, 1998), and who constitute a rapidly growing migrant group. In 2011, five percent of the foreign-born population of England and Wales was born in Nigeria and South Africa alone, with the Nigerian population growing from 87,000 in 2001 to 191,000 in 2011 (ONS, 2013c). Notably, the history of immigration from Africa includes one large group of Africans and South Asians who were expelled from Uganda by Idi Amin in 1972. Most of these are Indians by ethnicity, but in this thesis they are classified according to their country of birth, which for many was Uganda. Based on census data, it is estimated that the Ugandan-born population increased from 12,000 to 45,000 between 1971 and 1981 (ONS, 2013c).

In addition to historical trends, it is important to note how quickly migration has changed in the UK over the last few decades. The UK experienced net out-migration during the 1960s and 1970s, and similar inflows

and outflows from the 1980s to the mid-1990s, but this was followed by a continuous period of net inflows from the mid-1990s until the present day (up to September 2014) (Horsfield, 2005; ONS, 2015d). In every year since 1999, net migration has been at a level of more than 150,000 people per year (ONS, 2015d, 2015e), and many of these immigrants have chosen, at least until now, to remain in the UK. For instance, half of all foreign-born residents of England and Wales in 2011 stated that their year of arrival was during the period 2001-2011 (ONS, 2013c). Given a total foreign-born population of 7.5 million people, this equates to an increase of more than three million people in ten years. As mentioned, this sustained inflow has promoted a considerable interest in the lives of migrants, as well as their relationship to UK society and the native population.

1.4.4 UK data sources

Before moving away from a discussion of the UK context, it may be useful to provide a short background on UK data sources. Among other things, this highlights the advantages of the data that are used in this thesis, alongside differences from sources that have been used to study migrant fertility in other contexts.

Considering the data and methods that have been used to study migrant fertility in the UK, it is perhaps unsurprising that most existing knowledge is based on total period fertility rates. Official statistics that are published by ONS are estimated using data from birth registration (for the number and characteristics of births), alongside Annual Population Survey (APS) and census data (that are used to calculate population estimates for the denominators of birth rates) (Dormon, 2014; ONS, 2014b, 2014c, 2014d; Tromans et al., 2007; Zumpe et al., 2012). The limits of these data include the fact that registered births are cross-sectional, and it is not possible to link data at the individual level from year to year, so information is not available on either cumulative or completed fertility. In addition, the data include only a limited

number of variables, thereby restricting their ability to investigate questions about differentials, convergence, or the links between fertility and migration. For example, birth registration data do not include information on age at migration or parental country of birth.

For these reasons, some researchers have chosen to use social survey data to study migrant fertility in the UK. One commonly used source has been the Labour Force Survey (LFS), which includes a much larger number of variables than registered births, in particular age at migration (ONS, 2015c). However, this is also a cross-sectional source, which collects no information on fertility or birth history. As such, it requires fertility to be estimated based on the number of children resident in a mother's household (i.e. the own-child method: Dubuc, 2009; Grabill & Cho, 1965). This source is therefore unsuitable for the estimation of birth histories or completed fertility.

Unfortunately, most other surveys collect samples that are too small for the analysis of different migrant groups, including analysis by country of birth. For example, this is the case for the General Household Survey and General Lifestyle Survey, even though they have collected information on fertility history (ONS, 2015a, 2015b). It is also the case for the various British birth cohort studies (CLS, 2015).

Fortunately, for the feasibility of this thesis, there are two data sources that provide suitable data for its empirical research. These are Understanding Society (UKHLS) (Boreham, Boldysevaite, & Killpack, 2012; Buck & McFall, 2011; Hobcraft & Sacker, 2011; Lynn, 2009; Lynn & Kaminska, 2010) and the Office for National Statistics Longitudinal Study (ONS LS) (Blackwell, Lynch, Smith, & Goldblatt, 2003; Dale, Creeser, Dodgeon, Gleave, & Filakti, 1993; Hattersley & Creeser, 1995). These sources both contain large samples of immigrants and their descendants, information on parental country of birth and age at migration, as well as detailed information on fertility history. This means that the number of first and second generation sample members is sufficiently large to enable different origin groups to be identified.

1.5 The structure of this thesis

Throughout this introduction, I have provided evidence about the current state of research on migrant fertility and the limits of existing knowledge. In this final section, I provide an overview of the rest of the thesis, including a brief outline of how the four research papers link together. By way of introduction, table 1.9 provides the titles of each of the thesis papers.

Table 1.9: Thesis chapters

Chapter	Title
2*	Defining and testing the convergence of migrant fertility
3	Understanding how immigrant fertility differentials vary over the reproductive life course
4	Intergenerational assimilation of completed fertility: Comparing the convergence of different origin groups
5*	What is the influence of childhood exposure to cultural norms? The role of segregation and community composition in explaining migrant fertility

* Co-authored with my supervisors (see p.3)

The structure of this thesis reflects the approach that I have taken throughout my PhD, and derives from the knowledge that I have developed over the last four years. When investigating migrant fertility, demographers have almost always tried to answer questions relating to differentials, convergence, and the relationships between migration and fertility. Taken as a whole, my thesis touches upon each of these three aspects of the literature. As explained in this introduction, these three aspects of migrant fertility research are not mutually exclusive. However, it is helpful to distinguish between them because it shows how the literature has developed, and helps to identify the limits of previous research. In early studies of migrant fertility, most researchers focused on differentials. It was only in later studies that researchers

began to study differentials and convergence. And later still that they carried out empirical tests of the relationships between migration and fertility, many of which include the analysis of differentials and convergence.

The first paper in this thesis, chapter 2, represents an exploration of the links between differentials and convergence. It focuses on the concept of convergence, but in doing so highlights the importance of differentials for the study of convergence. Chapters 3 and 5 then inform research on convergence through their studies of differentials and how they vary, either across the life course (chapter 3), or by exposure to cultural norms (chapter 5). Compared to these other empirical chapters, the paper in chapter 4 takes a more direct approach to convergence by testing whether completed fertility differentials converge over generations for different ancestral origin groups.

As well as contributing to the study of migrant fertility convergence, each paper also contributes towards explaining the relationships between migration and fertility. Chapter 2 outlines the different reasons why researchers may be interested in convergence, including adaptation, assimilation, and the cultural determinants of fertility. In chapter 2, they are used to differentiate between types of convergence and show how different explanations might be tested. Chapter 3 considers the relationships between migration and fertility less directly due to its focus on life course differentials, but the findings nevertheless provide implications for future studies of the relationships between migration and fertility. Then, a more direct study of these relationships is carried out in chapters 4 and 5. The aim of chapter 4 is to investigate convergence over generations, as predicted by intergenerational assimilation. This type of convergence can explain how migration contributes to destination fertility over the long-run. Chapter 5 investigates a different but related explanation, the childhood socialisation hypothesis, and it does this by examining the extent to which migrant fertility differentials can be explained by exposure to cultural norms.

There are many other links between the different chapters of this thesis, and a number of these are explored, alongside the findings, in the thesis conclusion (chapter 6). One link that may be important to mention here is the investigation of variation in differentials by (ancestral) origin group. While this is only discussed briefly in chapter 2, it is a focus of the research in all of the empirical chapters (3-5). One of the stated aims of chapters 3 and 4 is to investigate heterogeneity by origin, both with respect to life course differentials and generational convergence. In chapter 5, the analysis of exposure to cultural norms makes use of different measures of community composition, several of which are matched to an individual's (ancestral) origin group. In addition, chapter 5 focuses on the fertility of first and second generation South Asians, which is driven in part by evidence of their fertility differentials in the previous chapters (3 and 4).

The aim of this thesis is to develop new knowledge about the fertility of international migrants and their descendants. Considering the links between each of the chapters of this thesis, it is hoped that the collective findings can achieve this aim. As the first stage in this task, the next chapter begins by critically evaluating the concept of migrant fertility convergence.

References

- Abbasi-Shavazi, M. J., & McDonald, P. (2000). Fertility and multiculturalism: Immigrant fertility in Australia, 1977-1991. *International Migration Review*, 34(1), 215-242.
- Abbasi-Shavazi, M. J., & McDonald, P. (2002). A comparison of fertility patterns of European immigrants in Australia with those in the countries of origin. *Genus*, 58(1), 53-76.
- Abel, G. J., & Sander, N. (2014). Quantifying Global International Migration Flows. *Science*, 343(6178), 1520-1522. <http://doi.org/10.1126/science.1248676>
- Abma, J. C., & Krivo, L. J. (1991). The Ethnic Context of Mexican American Fertility. *Sociological Perspectives*, 34(2), 145-164.
- Adserà, A., & Ferrer, A. (2014a). Factors influencing the fertility choices of child immigrants in Canada. *Population Studies*, 68(1), 65-79. <http://doi.org/10.1080/00324728.2013.802007>
- Adserà, A., & Ferrer, A. (2014b). The Fertility of Married Immigrant Women to Canada. *International Migration Review*. <http://doi.org/10.1111/imre.12114>
- Adserà, A., & Ferrer, A. M. (2011). Age at Migration, Language and Fertility Patterns Among Migrants to Canada. *IZA Discussion Paper No. 5552*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1778896
- Adserà, A., Ferrer, A. M., Sigle-Rushton, W., & Wilson, B. (2012). Fertility Patterns of Child Migrants Age at Migration and Ancestry in Comparative Perspective. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 160-189. <http://doi.org/10.1177/0002716212444706>
- Alba, R., & Nee, V. (2005). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Alders, M. (2000). *Cohort fertility of migrant women in the Netherlands: Developments in fertility of women born in Turkey, Morocco, Suriname, and the Netherlands Antilles and Aruba*. Department of Population Division, Statistics Netherlands, Paper for the BSPS-NVD-URU Conference, Utrecht, 31 August - 1 September, 2000.
- Allen, K., & Warrell, H. (2013, August 8). Baby boom drives UK population growth. *Financial Times*. Retrieved from <http://www.ft.com/cms/s/0/7a42c2de-0008-11e3-9c40-00144feab7de.html#axzz3WIAOxn9O>
- Andersson, G. (2004). Childbearing after Migration: Fertility Patterns of Foreign-born Women in Sweden. *International Migration Review*, 38(2), 747-774.
- Andersson, G., & Scott, K. (2005). Labour-market status and first-time parenthood: The experience of immigrant women in Sweden, 1981-97. *Population Studies*, 59(1), 21-38. <http://doi.org/10.1080/0032472052000332683>
- Aspinall, P. J. (2009). The Future of Ethnicity Classifications. *Journal of Ethnic and Migration Studies*, 35(9), 1417-1435. <http://doi.org/10.1080/13691830903125901>
- Bachrach, C. A. (2013). Culture and Demography: From Reluctant Bedfellows to Committed Partners. *Demography*. <http://doi.org/10.1007/s13524-013-0257-6>
- Bagavos, C., Tsimbos, C., & Verropoulou, G. (2007). Native and Migrant Fertility Patterns in Greece: A Cohort Approach. *European Journal of Population / Revue Européenne de Démographie*, 24(3), 245-263. <http://doi.org/10.1007/s10680-007-9142-6>
- BBC. (2007, September 19). Analysis: The impact of migrants. *BBC (online)*. Retrieved from <http://news.bbc.co.uk/1/hi/uk/7001947.stm>
- BBC. (2008, August 21). More long-term migrants to UK. *BBC*. Retrieved from <http://news.bbc.co.uk/1/hi/uk/7574382.stm>

- BBC. (2009, November 19). Migration v ageing population - a tricky trade-off. *BBC (online)*. Retrieved from <http://news.bbc.co.uk/1/hi/8368230.stm>
- BBC. (2012, October 7). Cameron considers EU migrant curb. *BBC*. Retrieved from <http://www.bbc.co.uk/news/uk-politics-19862253>
- BBC. (2013a). Booming birth rate "a strain on NHS midwifery services." *BBC News*. Retrieved from <http://www.bbc.co.uk/news/health-21120593>
- BBC. (2013b). Recent immigrants to UK "make net contribution." *BBC News*. Retrieved from <http://www.bbc.co.uk/news/uk-24813467>
- BBC. (2014, January 25). How much do migrants cost or benefit a nation? *BBC*. Retrieved from <http://www.bbc.co.uk/news/magazine-25880373>
- BBC. (2015). Net migration up to 298,000 as Conservative target missed. *BBC News*. Retrieved from <http://www.bbc.co.uk/news/uk-politics-31638174>
- Bean, F. D., Cullen, R. M., Stephen, E. H., & Swicegood, C. G. (1984). Generational Differences in Fertility Among Mexican Americans: Implications for Assessing the Effects of Immigration. *Social Science Quarterly (University of Texas Press)*, 65(2), 573–582.
- Bean, F. D., & Swicegood, G. (1982). Generation, Female Education and Mexican American Fertility. *Social Science Quarterly (University of Texas Press)*, 63(1), 131–144.
- Bean, F. D., & Swicegood, G. (1985). *Mexican American fertility patterns*. University of Texas Press Austin.
- Bélanger, A., & Gilbert, S. (2006). The fertility of immigrant women and their Canadian-born daughters. In *Report on the Demographic Situation in Canada, 2002* (pp. 127–151). Statistics Canada.
- Berry, J. W. (1997). Immigration, Acculturation, and Adaptation. *Applied Psychology*, 46(1), 5–34. <http://doi.org/10.1111/j.1464-0597.1997.tb01087.x>
- Berry, J. W. (2005). Acculturation: Living successfully in two cultures. *International Journal of Intercultural Relations*, 29(6), 697–712. <http://doi.org/10.1016/j.ijintrel.2005.07.013>
- Billari, F. C. (2015). Integrating macro- and micro-level approaches in the explanation of population change. *Population Studies*, 69(sup1), S11–S20. <http://doi.org/10.1080/00324728.2015.1009712>
- Blackwell, L., Lynch, K., Smith, J., & Goldblatt, P. (2003). *Longitudinal study 1971-2001: completeness of census linkage*. London: Office for National Statistics. Retrieved from <http://www.census2001.gov.uk/downloads/theme-population/LS-no.10.pdf>
- Blau, F. D. (1991). The Fertility of Immigrant Women: Evidence from High Fertility Source Countries. *National Bureau of Economic Research Working Paper Series, No. 3608*. Retrieved from <http://www.nber.org/papers/w3608>
- Blau, F. D., Kahn, L. M., Liu, A. Y.-H., & Papps, K. L. (2013). The transmission of women's fertility, human capital, and work orientation across immigrant generations. *Journal of Population Economics*, 26(2), 405–435. <http://doi.org/10.1007/s00148-012-0424-x>
- Bledsoe, C. H. (2004). Reproduction at the Margins: Migration and Legitimacy in the New Europe. *Demographic Research, Special 3*, 87–116. <http://doi.org/10.4054/DemRes.2004.S3.4>
- Bonar, J. (1966). *Theories of population from Raleigh to Arthur Young*. New York: A.M. Kelley.
- Boreham, R., Boldysevaite, D., & Killpack, C. (2012). *UKHLS - Wave 1: Technical Report*. Retrieved from https://www.understandingsociety.ac.uk/system/uploads/asset/000/000/010/original/Wave_1_Technical_Report.pdf?1354035538

- Brown, S. K., & Bean, F. D. (2005). International migration. In *Handbook of population* (pp. 347–382). Springer. Retrieved from http://link.springer.com/chapter/10.1007/0-387-23106-4_13
- Brubaker, R. (2001). The return of assimilation? Changing perspectives on immigration and its sequels in France, Germany, and the United States. *Ethnic and Racial Studies*, 24(4), 531–548. <http://doi.org/10.1080/01419870120049770>
- Buck, N., & McFall, S. (2011). Understanding Society: design overview. *Longitudinal and Life Course Studies*, 3(1), 5 – 17.
- Burton, J., Nandi, A., & Platt, L. (2010). Measuring ethnicity: challenges and opportunities for survey research. *Ethnic and Racial Studies*, 33(8), 1332–1349. <http://doi.org/10.1080/01419870903527801>
- Carlson, E. D. (1985). The Impact of International Migration Upon the Timing of Marriage and Childbearing. *Demography*, 22(1), 61–72. <http://doi.org/10.2307/2060986>
- Carpenter, N. (1927). *Immigrants and Their Children, 1920: A Study Based on Census Statistics Relative to the Foreign Born and the Native White of Foreign Or Mixed Parentage*. U.S. Government Printing Office.
- Cassedy, J. H. (1969). *Demography in early America: beginnings of the statistical mind, 1600-1800*. Harvard University Press.
- Christensen, K., Doblhammer, G., Rau, R., & Vaupel, J. W. (2009). Ageing populations: the challenges ahead. *The Lancet*, 374(9696), 1196–1208. [http://doi.org/10.1016/S0140-6736\(09\)61460-4](http://doi.org/10.1016/S0140-6736(09)61460-4)
- Claghorn, K. H. (1901). The foreign immigrant in New York City. *Reports of the Industrial Commission*, 15, 465–92.
- CLS. (2015). Centre for Longitudinal Studies (CLS). Retrieved April 29, 2015, from <http://www.cls.ioe.ac.uk/>
- Coleman, D. A. (1982). *Demography of immigrants and minority groups in the United Kingdom: proceedings of the eighteenth annual symposium of the Eugenics Society, London 1981*. Academic Press.
- Coleman, D. A. (1994). Trends in fertility and intermarriage among immigrant populations in Western Europe as measures of integration. *Journal of Biosocial Science*, 26(1), 107–136.
- Coleman, D. A. (2006). Immigration and Ethnic Change in Low-Fertility Countries: A Third Demographic Transition. *Population and Development Review*, 32(3), 401–446.
- Coleman, D. A. (2010). Projections of the Ethnic Minority Populations of the United Kingdom 2006–2056. *Population and Development Review*, 36(3), 441–486. <http://doi.org/10.1111/j.1728-4457.2010.00342.x>
- Coleman, D. A., Compton, P., & Salt, J. (2002). Demography of migrant populations: the case of the United Kingdom. In W. Haug, P. Compton, & Y. Courbage (Eds.), *The demographic characteristics of immigrant populations* (p. 497). Council of Europe Publishing.
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64(1), 19–41. <http://doi.org/10.1080/00324720903391201>
- Crul, M., & Vermeulen, H. (2003). The Second Generation in Europe. *International Migration Review*, 37(4), 965–986. <http://doi.org/10.1111/j.1747-7379.2003.tb00166.x>
- Dale, A., Creaser, R., Dodgeon, B., Gleave, S., & Filakti, H. (1993). An introduction to the OPCS Longitudinal Study. *Environment and Planning A*, 25(10), 1387 – 1398. <http://doi.org/10.1068/a251387>
- Daley, P. O. (1998). Black Africans in Great Britain: Spatial concentration and segregation. *Urban Studies*, 35(10), 1703–1724.

- Davis, K., & Blake, J. (1956). Social Structure and Fertility: An Analytic Framework. *Economic Development and Cultural Change*, 4(3), 211–235.
- Demeny, P. (2011). Population Policy and the Demographic Transition: Performance, Prospects, and Options. *Population and Development Review*, 37(s1), 249–274.
<http://doi.org/10.1111/j.1728-4457.2011.00386.x>
- Dormon, O. (2014). *Childbearing of UK and non-UK born women living in the UK - 2011 Census data*. Office for National Statistics. Retrieved from
http://www.ons.gov.uk/ons/dcp171766_350433.pdf
- Dubuc, S. (2009). Application of the Own-Children Method for estimating fertility by ethnic and religious groups in the UK. *Journal of Population Research*, 26(3), 207–225.
<http://doi.org/10.1007/s12546-009-9020-7>
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>
- Dubuc, S., & Haskey, J. (2010). Ethnicity and Fertility in the United Kingdom. In J. Stillwell & M. Ham (Eds.), *Ethnicity and Integration* (pp. 63–81). Dordrecht: Springer Netherlands. Retrieved from
<http://www.springerlink.com/gate2.library.lse.ac.uk/content/x75262030127783t/>
- Dumont, A. (1894). Démographie des étrangers habitant en France. *Bulletins de La Société D'anthropologie de Paris*, 5(1), 419–433. <http://doi.org/10.3406/bmsap.1894.5528>
- Dumont, A. (1897). Essai sur la natalité au Massachusetts. *Journal de la société française de statistique*, 38, 385–395.
- Dyson, T. (2010). *Population and development: the demographic transition*. London, UK: Zed Books. Retrieved from <http://www.zedbooks.co.uk/>
- Easton, M. (2012, July 16). What is the UK's optimum population? *BBC*. Retrieved from
<http://www.bbc.co.uk/news/uk-18854762>
- Easton, M. (2013). More UK births than any year since 1972, says ONS. *BBC News*. Retrieved from <http://www.bbc.co.uk/news/uk-23618487>
- European Commission. (2011). Migrants in Europe: A statistical portrait of the first and second generation. *Luxembourg: Publications Office of the European Union*.
- Fernández, R., & Fogli, A. (2006). Fertility: The role of culture and family experience. *Journal of the European Economic Association*, 4(2-3), 552–561.
- Fernández, R., & Fogli, A. (2009). Culture: An Empirical Investigation of Beliefs, Work, and Fertility. *American Economic Journal: Macroeconomics*, 1(1), 146–177.
<http://doi.org/10.1257/mac.1.1.146>
- Finkle, J. L., & McIntosh, C. A. (1994). The New Politics of Population. *Population and Development Review*, 20, 3. <http://doi.org/10.2307/2807937>
- Finney, N., & Simpson, L. (2009). Population Dynamics: The Roles of Natural Change and Migration in Producing the Ethnic Mosaic. *Journal of Ethnic and Migration Studies*, 35(9), 1479–1496. <http://doi.org/10.1080/13691830903125935>
- Fischer, N. A., & Marcum, J. P. (1984). Ethnic Integration, Socioeconomic Status, and Fertility Among Mexican Americans. *Social Science Quarterly (University of Texas Press)*, 65(2), 583–593.
- Fokkema, T., de Valk, H., de Beer, J., & Van Duin, C. (2008). The Netherlands: Childbearing within the context of a “Poldermodel” society. *Demographic Research*, 19, 743–794.
<http://doi.org/10.4054/DemRes.2008.19.21>

- Foner, N. (2009). Gender and Migration: West Indians in Comparative Perspective. *International Migration*, 47(1), 3–29. <http://doi.org/10.1111/j.1468-2435.2008.00480.x>
- Forste, R., & Tienda, M. (1996). What's Behind Racial and Ethnic Fertility Differentials? *Population and Development Review*, 22, 109–133. <http://doi.org/10.2307/2808008>
- Frank, R., & Heuveline, P. (2005). A cross-over in Mexican and Mexican-American fertility rates. *Demographic Research*, 12, 77–104. <http://doi.org/10.4054/DemRes.2005.12.4>
- Friedlander, D., & Goldscheider, C. (1978). Immigration, Social Change and Cohort Fertility in Israel. *Population Studies*, 32(2), 299–317. <http://doi.org/10.2307/2173563>
- Garssen, J., & Nicolaas, H. (2008). Fertility of Turkish and Moroccan women in the Netherlands: Adjustment to native level within one generation. *Demographic Research*, 19, 1249–1280. <http://doi.org/10.4054/DemRes.2008.19.33>
- Genereux, A. (2007). A review of migration and fertility theory through the lens of African immigrant fertility in France. *Max Planck Institute for Demographic Research, Working Paper, February 2007, Approved for Release by: Gerda Ruth Neyer (neyer@Demogr. Mpg. De), Deputy Head of the Laboratory of Contemporary European Fertility and Family Dynamics*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.113.2216&rep=rep1&type=pdf>
- Gillette, J. M. (1926). Immigration and the Increase of Population in the United States. *Social Forces*, 5(1), 37–51. <http://doi.org/10.2307/3004803>
- Gjerde, J., & McCants, A. (1995). Fertility, marriage, and culture: Demographic processes among Norwegian immigrants to the rural middle west. *The Journal of Economic History*, 55(04), 860–888.
- Glusker, A. I. (2003). *Fertility Patterns of Native-and Foreign-born Women: Assimilating to Diversity*. LFB Scholarly Publishing LLC.
- Goldscheider, C., & Uhlenberg, P. R. (1969). Minority Group Status and Fertility. *American Journal of Sociology*, 74(4), 361–372.
- Goldstein, S., & Goldscheider, C. (1968). Jewish Americans. Three Generations in a Jewish Community. Retrieved from <http://eric.ed.gov/?id=ED061394>
- Goldstein, S., & Goldstein, A. (1983). Migration and Fertility in Peninsular Malaysia. *A Rand Note, Prepared for The Agency for International Development, [N-1860-AID]*. Retrieved from <http://www.rand.org/pubs/notes/N1860.html>
- Grabill, W. R., & Cho, L. J. (1965). Methodology for the measurement of current fertility from population data on young children. *Demography*, 2(1), 50–73.
- Grant, J., Hoorens, S., Sivadasan, S., van het Loo, M., DaVanzo, J., Hale, L., ... Butz, W. (2004). *Low fertility and population ageing: causes consequences and policy options*. RAND Corporation.
- Gurak, D. T. (1980). Assimilation and fertility: A comparison of Mexican American and Japanese American women. *Hispanic Journal of Behavioral Sciences*.
- Hajnal, J. (1947). The Analysis of Birth Statistics in the Light of the Recent International Recovery of the Birth-Rate. *Population Studies*, 1(2), 137–164. <http://doi.org/10.2307/2172285>
- Hall, M. (2014, November 26). Population soars due to foreign family baby boom. *Express.co.uk*. Retrieved from <http://www.express.co.uk/news/uk/540073/Population-increase-due-to-migrant-births>
- Hammel, E. A. (1990). A Theory of Culture for Demography. *Population and Development Review*, 16(3), 455–485. <http://doi.org/10.2307/1972832>

- Harbison, S. F., & Weishaar, M. (1981). Samoan Migrant Fertility: Adaptation and Selection. *Human Organization*, 40(3), 268–273.
- Harper, S., & Hamblin, K. (2014). *International Handbook on Ageing and Public Policy*. Edward Elgar Publishing.
- Hattersley, L., & Creeser, R. (1995). *Longitudinal study 1971-1991: history, organisation and quality of data*. London: Office of Population Censuses and Surveys, H.M.S.O.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.
- Heath, A. F., Rothon, C., & Kilpi, E. (2008). The Second Generation in Western Europe: Education, Unemployment, and Occupational Attainment. *Annual Review of Sociology*, 34(1), 211–235. <http://doi.org/10.1146/annurev.soc.34.040507.134728>
- Hervitz, H. M. (1985). Selectivity, adaptation, or disruption? A comparison of alternative hypotheses on the effects of migration on fertility: The case of Brazil. *International Migration Review*, 19(2), 293–317.
- Hill, J. A. (1913). Comparative Fecundity of Women of Native and Foreign Parentage in the United States. *Publications of the American Statistical Association*, 13(104), 583–604. <http://doi.org/10.2307/2965013>
- Hill, L. E., & Johnson, H. P. (2004). Fertility Changes Among Immigrants: Generations, Neighborhoods, and Personal Characteristics. *Social Science Quarterly*, 85(3), 811–827. <http://doi.org/10.1111/j.0038-4941.2004.00246.x>
- Hinde, A. (1998). *Demographic Methods*. London: Routledge.
- Hirschman, C., & Tolnay, S. E. (2005). Social Demography. In *Handbook of population* (pp. 419–449). Springer. Retrieved from http://link.springer.com/chapter/10.1007/0-387-23106-4_13
- Hobcraft, J., & Kiernan, K. (2001). Childhood poverty, early motherhood and adult social exclusion. *The British Journal of Sociology*, 52(3), 495–517. <http://doi.org/10.1080/00071310120071151>
- Hobcraft, J., & Sacker, A. (2011). Guest Editorial: the origins of Understanding Society. *Longitudinal and Life Course Studies*, 3(1), 1 – 4.
- Hoem, J. M. (2008). Overview Chapter 8: The impact of public policies on European fertility. *Demographic Research*, 19, 249–260. <http://doi.org/10.4054/DemRes.2008.19.10>
- Home Office. (2014). Policy and legislative changes affecting migration to the UK: timeline. Retrieved February 16, 2015, from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/377872/user-guide-policy-changes.ods
- Hornsby-Smith, M. P., & Dale, A. (1988). The Assimilation of Irish Immigrants in England. *The British Journal of Sociology*, 39(4), 519–544. <http://doi.org/10.2307/590499>
- Horsfield, G. (2005). International Migration. In *Focus on People and Migration* (pp. 115–119). London: Palgrave Macmillan.
- Illiffe, L. (1978). Estimated fertility rates of Asian and West Indian immigrant women in Britain, 1969-74. *Journal of Biosocial Science*, 10(2), 189–197.
- Jonsson, S. H., & Rendall, M. S. (2004). The Fertility Contribution of Mexican Immigration to the United States. *Demography*, 41(1), 129–150.
- Kahn, J. R. (1988). Immigrant Selectivity and Fertility Adaptation in the United States. *Social Forces*, 67(1), 108–128.

- Kahn, J. R. (1994). Immigrant and native fertility during the 1980s: adaptation and expectations for the future. *International Migration Review*, 28(3), 501–519.
- Kantorová, V., Biddlecom, A., & Newby, H. (2014). Keeping pace with population growth. *The Lancet*, 384(9940), 307–308.
- Kertzer, D. I. (1997). The proper role of culture in demographic explanation. In G. W. Jones, R. M. Douglas, J. C. Caldwell, & R. M. D'Souza (Eds.), *The Continuing Demographic Transition* (pp. 137–157). Oxford: Oxford University Press.
- Kuczynski, R. R. (1901). The Fecundity of the Native and Foreign born Population in Massachusetts (I.). *The Quarterly Journal of Economics*, 16(1), 1–36.
<http://doi.org/10.2307/1882901>
- Kuczynski, R. R. (1902). The Fecundity of the Native and Foreign born Population in Massachusetts (II.). *The Quarterly Journal of Economics*, 16(2), 141.
- Kuczynski, R. R. (1932). *Fertility and reproduction*. Falcon Press.
- Kulu, H., & González-Ferrer, A. (2014). Family Dynamics Among Immigrants and Their Descendants in Europe: Current Research and Opportunities. *European Journal of Population*, 30(4), 411–435. <http://doi.org/10.1007/s10680-014-9322-0>
- Lee, R., & Mason, A. (2010). Some macroeconomic aspects of global population aging. *Demography*, 47(1), S151–S172. <http://doi.org/10.1353/dem.2010.0002>
- Lindstrom, D. P., & Giorguli Saucedo, S. (2007). The interrelationship of fertility, family maintenance and Mexico-U.S. Migration. *Demographic Research*, 17, 821–858.
<http://doi.org/10.4054/DemRes.2007.17.28>
- Littlejohn, R. (2014). Not so much breeding for Britain, more like breeding for benefits. *Mail Online*. Retrieved from <http://www.dailymail.co.uk/debate/article-2650177/Not-breeding-Britain-like-breeding-benefits.html>
- Livi-Bacci, M. (2012). *A Concise History of World Population*. John Wiley & Sons.
- Livi Bacci, M. (2012). *A short history of migration ; translated by Carl Ipsen*. Cambridge, UK; Malden, MA: Polity Press.
- Lopez, D. E., & Sabagh, G. (1978). Untangling structural and normative aspects of the minority status-fertility hypothesis. *American Journal of Sociology*, 83(6), 1491–1497.
- Lorimer, F. (1956). Culture and Human Fertility. *Journal of School Health*, 26(4), 136–136.
<http://doi.org/10.1111/j.1746-1561.1956.tb00823.x>
- Lübke, C. (2015). How Migration Affects the Timing of Childbearing: The Transition to a First Birth Among Polish Women in Britain. *European Journal of Population*, 31(1), 1–20.
<http://doi.org/10.1007/s10680-014-9326-9>
- Lutz, W. (2013). Demographic Metabolism: A Predictive Theory of Socioeconomic Change. *Population and Development Review*, 38(s1), 283–301.
- Lynn, P. (2009). *Sample Design for Understanding Society*. Retrieved from <http://research.understandingsociety.org.uk/publications/working-paper/2009-01.pdf>
- Lynn, P., & Kaminska, O. (2010). *Weighting strategy for Understanding Society*. Understanding Society at the Institute for Social and Economic Research.
- Malthus, T. R. (1798). *An essay on the principle of population*. Dent London. Retrieved from <http://www.encyclopedia.com/pdfs/8/896.pdf>
- Manning, P., & Trimmer, T. (2013). *Migration in World History*. Routledge.

- Marin, B. V. O., Gomez, C. A., & Hearst, N. (1993). Multiple Heterosexual Partners and Condom Use among Hispanics and Non-Hispanic Whites. *Family Planning Perspectives*, 25(4), 170-174. <http://doi.org/10.2307/2135925>
- Mason, R. (2012, October 25). One in four British babies born to foreign mothers. Retrieved from <http://www.telegraph.co.uk/news/9634127/One-in-four-British-babies-born-to-foreign-mothers.html>
- Massey, D. S. (1981). Dimensions of the New Immigration to the United States and the Prospects for Assimilation. *Annual Review of Sociology*, 7, 57-85. <http://doi.org/10.1146/annurev.so.07.080181.000421>
- Massey, D. S. (2005). *Worlds in Motion: Understanding International Migration at the End of the Millennium* (OUP Catalogue). Oxford University Press. Retrieved from <http://ideas.repec.org/b/oxp/obooks/9780199282760.html>
- Mateos, P., Singleton, A., & Longley, P. (2009). Uncertainty in the Analysis of Ethnicity Classifications: Issues of Extent and Aggregation of Ethnic Groups. *Journal of Ethnic and Migration Studies*, 35(9), 1437-1460. <http://doi.org/10.1080/13691830903125919>
- Mayer, J., & Riphahn, R. T. (2000). Fertility assimilation of immigrants: Evidence from count data models. *Journal of Population Economics*, 13(2), 241-261.
- Micklin, M., & Poston Jr, D. L. (2005). Prologue: The Demographer's Ken: 50 Years of Growth and Change. In *Handbook of Population* (pp. 1-15). Springer. Retrieved from http://link.springer.com/content/pdf/10.1007/0-387-23106-4_1.pdf
- Milewski, N. (2007). First child of immigrant workers and their descendants in West Germany: Interrelation of events, disruption, or adaptation? *Demographic Research*, 17, 859-896. <http://doi.org/10.4054/DemRes.2007.17.29>
- Milewski, N. (2010a). *Fertility of immigrants: a two-generational approach in Germany*. Springer Berlin Heidelberg. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-642-03705-4_1
- Milewski, N. (2010b). Immigrant fertility in West Germany: Is there a socialization effect in transitions to second and third births? *European Journal of Population / Revue Européenne de Démographie*, 26, 297-323. <http://doi.org/10.1007/s10680-010-9211-0>
- Milewski, N. (2011). Transition to a first birth among Turkish second-generation migrants in Western Europe. *Advances in Life Course Research*, 16(4), 178-189. <http://doi.org/10.1016/j.alcr.2011.09.002>
- Mills, A., Durepos, G., & Wiebe, E. (2010). *Encyclopedia of Case Study Research*. 2455 Teller Road, Thousand Oaks California 91320 United States: SAGE Publications, Inc. Retrieved from <http://knowledge.sagepub.com/view/casestudy/SAGE.xml>
- Murphy, M. (1995). The impact of migration on population composition: The British case. In S. Voets, J. J. Schoorl, & B. de Bruijn (Eds.), *The demographic consequences of international migration* (pp. 207-224). The Hague: Netherlands Interdisciplinary Demographic Institute.
- Mussino, E., Iaccarino, C., Prati, S., & Strozza, S. (2010). Short term reproductive behaviour of foreign women who became mothers between 2002-2006 in Italy. *Vienna Yearbook of Population Research*, 2009, 63-82. <http://doi.org/10.1553/populationyearbook2009s63>
- Nahmias, P. (2004). Fertility behaviour of recent immigrants to Israel. *Demographic Research*, 10, 83-120. <http://doi.org/10.4054/DemRes.2004.10.4>
- Newell, C. (1993). *Methods and Models in Demography*. New York: Guilford Press.
- Neyer, G., & Andersson, G. (2008). Consequences of Family Policies on Childbearing Behavior: Effects or Artifacts? *Population and Development Review*, 34(4), 699-724.

- Ní Bhrolcháin, M. (1992). Period paramount? A critique of the cohort approach to fertility. *The Population and Development Review*, 599–629.
- Ní Bhrolcháin, M. (2011). Tempo and the TFR. *Demography*, 48(3), 841–861.
<http://doi.org/10.1007/s13524-011-0033-4>
- ONS. (2012). *Population by Country of Birth and Nationality Report*. Retrieved from
http://www.ons.gov.uk/ons/dcp171776_277619.pdf
- ONS. (2013a). *Cohort fertility - 2011*. Retrieved from
http://www.ons.gov.uk/ons/dcp171778_299058.pdf
- ONS. (2013b). *Detailed country of birth and nationality analysis from the 2011 Census of England and Wales*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_310441.pdf
- ONS. (2013c). *Immigration Patterns of Non-UK Born Populations in England and Wales in 2011*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_346219.pdf
- ONS. (2014a). *Annual Mid-year Population Estimates, 2013*. Retrieved from
http://www.ons.gov.uk/ons/dcp171778_367167.pdf
- ONS. (2014b). *Childbearing for Women Born in Different Years, England and Wales, 2013*. Retrieved from http://www.ons.gov.uk/ons/dcp171778_387280.pdf
- ONS. (2014c, February 4). How many babies born in England and Wales have mothers from other European Union countries? Retrieved February 4, 2014, from
<http://www.ons.gov.uk/ons/rel/fertility-analysis/childbearing-of-uk-and-non-uk-born-women-living-in-the-uk/2011-census-data/sty-mothers-country-of-birth.html>
- ONS. (2014d, July 16). Birth Summary Tables - England and Wales, 2013 (Excel sheet 223Kb). Retrieved from <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcn%3A77-317529>
- ONS. (2014e, August 28). Births in England and Wales by Parents' Country of Birth, 2013. Retrieved August 28, 2014, from <http://www.ons.gov.uk/ons/rel/vsob1/parents-country-of-birth-england-and-wales/2013/stb-births-by-cob-2013.html>
- ONS. (2015a). General Household Survey (GHS). Retrieved April 29, 2015, from
<http://www.ons.gov.uk/ons/rel/ghs/general-household-survey/index.html>
- ONS. (2015b). General Lifestyle Survey (GLF). Retrieved April 29, 2015, from
<http://www.ons.gov.uk/ons/rel/ghs/general-lifestyle-survey/index.html>
- ONS. (2015c). Labour Force Survey (LFS & APS user guide) [Text]. Retrieved April 29, 2015, from <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/labour-market-statistics/index.html>
- ONS. (2015d). *Migration Statistics Quarterly Report, February 2015*. Office for National Statistics. Retrieved from http://www.ons.gov.uk/ons/dcp171778_396645.pdf
- ONS. (2015e, February 26). Migration Statistics Quarterly Report. Retrieved April 14, 2015, from <http://www.ons.gov.uk/ons/rel/migration1/migration-statistics-quarterly-report/february-2015/index.html>
- Østby, L. (2002). *The demographic characteristics of immigrant population in Norway*. Oslo: Statistics Norway.
- Parekh, B. C. (2000). *The future of multi-ethnic Britain: report of the Commission on the Future of Multi-Ethnic Britain*. Profile Books.
- Parrado, E. A. (2011). How High is Hispanic/Mexican Fertility in the United States? Immigration and Tempo Considerations. *Demography*, 48(3), 1059–1080.
<http://doi.org/10.1007/s13524-011-0045-0>

- Parrado, E. A., & Morgan, S. P. (2008). Intergenerational Fertility Among Hispanic Women: New Evidence of Immigrant Assimilation. *Demography*, 45(3), 651–671.
- Peach, C. (2006). South Asian migration and settlement in Great Britain, 1951–2001. *Contemporary South Asia*, 15(2), 133–146.
- Portes, A., & Rumbaut, R. G. (2001). *Legacies: the story of the immigrant second generation*. Berkeley; New York: University of California Press ; Russell Sage Foundation.
- Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The Annals of the American Academy of Political and Social Science*, 530(1), 74–96.
- Preston, S., Heuveline, P., & Guillot, M. (2000). *Demography: Measuring and Modeling Population Processes* (1 edition). Oxford u.a.: Wiley-Blackwell.
- Rendall, M. S., & Ball, D. J. (2004). Immigration, emigration and the ageing of the overseas-born population in the United Kingdom. *Population Trends*, 116, 18–27.
- Rendall, M. S., & Salt, J. (2005). The foreign-born population. *Focus on People and Migration*, London: Palgrave Macmillan, 131–152.
- Ritchey, P. N. (1975). The Effect of Minority Group Status on Fertility: A Re-examination of Concepts. *Population Studies*, 29(2), 249–257. <http://doi.org/10.2307/2173510>
- Robards, J. (2012, June). *Estimating the fertility of recent migrants to England and Wales (1991–2001) – is there an elevated level of fertility after migration?* Presented at the European Population Conference, Stockholm University.
- Robards, J., Berrington, A., & Hinde, A. (2011). Estimating fertility rates using the ONS Longitudinal Study-what difference does the inclusion of non-continually resident members make? *Population Trends*, 144.
- Robards, J., Berrington, A., & Hinde, A. (2013). Identifying biases arising from combining census and administrative data – the fertility of migrants in the Office for National Statistics Longitudinal Study. *Longitudinal and Life Course Studies*, 4(3), 258–267.
- Rosenwaike, I. (1973). Two generations of Italians in America: their fertility experience. *International Migration Review*, 7(3), 271–280.
- Rudmin, F. W. (2003). Critical history of the acculturation psychology of assimilation, separation, integration, and marginalization. *Review of General Psychology*, 7(1), 3–37. <http://doi.org/10.1037/1089-2680.7.1.3>
- Rumbaut, R. G., & Portes, A. (Eds.). (2001). *Ethnicities: children of immigrants in America*. Berkeley [u.a.: Univ. of California Press.
- Rumbaut, R. G., & Weeks, J. R. (1986). Fertility and Adaptation: Indochinese Refugees in the United States. *International Migration Review*, 20(2), 428–466. <http://doi.org/10.2307/2546043>
- Schwartz, S. J., Unger, J. B., Zamboanga, B. L., & Szapocznik, J. (2010). Rethinking the concept of acculturation: Implications for theory and research. *American Psychologist*, 65(4), 237.
- Scott, K., & Stanfors, M. (2011). The transition to parenthood among the second generation: Evidence from Sweden, 1990–2005. *Advances in Life Course Research*, 16(4), 190–204. <http://doi.org/10.1016/j.alcr.2011.09.003>
- Sedghi, A. (2014). Is it true there is a “startling” rise in the birthrate of British Muslims? *The Guardian*. Retrieved from <http://www.theguardian.com/news/datablog/2014/jan/10/rise-british-muslim-birthrate-the-times-census>
- Sigle-Rushton, W. (2008). England and Wales: Stable fertility and pronounced social status differences. *Demographic Research*, 19(15), 455–502.

- Singley, S. G., & Landale, N. S. (1998). Incorporating Origin and Process in Migration-Fertility Frameworks: The Case of Puerto Rican Women. *Social Forces*, 76(4), 1437-1464.
<http://doi.org/10.2307/3005841>
- Skeldon, R. (2013). *Global Migration: Demographic Aspects and Its Relevance for Development* (Technical Paper No. 2013/6). Retrieved from
http://www.un.org/esa/population/migration/documents/EGM.Skeldon_17.12.2013.pdf
- Smallwood, S., & Chamberlain, J. (2005). Replacement fertility, what has it been and what does it mean? *Population Trends*, 119, 16-27.
- Smith, J. P. (2003). Assimilation across the Latino Generations. *The American Economic Review*, 93(2), 315-319.
- Smith, J. P. (2006). Immigrants and the Labor Market. *Journal of Labor Economics*, 24(2), 203-233.
<http://doi.org/10.1086/jole.2006.24.issue-2>
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225-248. <http://doi.org/10.4054/DemRes.2008.19.9>
- Sobotka, T., & Lutz, W. (2011). Misleading Policy Messages Derived from the Period TFR: Should We Stop Using It? *Comparative Population Studies*, 35(3). Retrieved from
<http://www.comparativepopulationstudies.de/index.php/CPoS/article/view/54>
- Sorenson, A. M. (1988). The Fertility and Language Characteristics of Mexican-American and Non-Hispanic Husbands and Wives. *The Sociological Quarterly*, 29(1), 111-130.
<http://doi.org/10.2307/4121576>
- Spengler, J. J. (1930). *The fecundity of native and foreign-born women in New England*. Brookings Institution,.
- Spengler, J. J. (1931). The Decline in Birth-Rate of the Foreign Born. *The Scientific Monthly*, 32(1), 54-59.
- Statistics New Zealand. (2012). *Demographic trends: 2011*. Wellington: Statistics New Zealand ISSN.
- Stephen, E. H., & Bean, F. D. (1992). Assimilation, Disruption and the Fertility of Mexican-Origin Women in the United States. *International Migration Review*, 26(1), 67-88.
<http://doi.org/10.2307/2546937>
- Stillwell, J. (2011). *Population Dynamics and Projection Methods*. Dordrecht : Springer Science Business Media B.V.,.
- Swicegood, G., Bean, F. D., Stephen, E. H., & Opitz, W. (1988). Language usage and Fertility in the Mexican-Origin Population of the United States. *Demography*, 25(1), 17-33.
<http://doi.org/10.2307/2061475>
- The Telegraph. (2010, May 26). Birth rate falls in England for first time in almost a decade. Retrieved from
<http://www.telegraph.co.uk/news/uknews/immigration/7764311/Birth-rate-falls-in-England-for-first-time-in-almost-a-decade.html>
- Thomson, M., & Crul, M. (2007). The Second Generation in Europe and the United States: How is the Transatlantic Debate Relevant for Further Research on the European Second Generation? *Journal of Ethnic and Migration Studies*, 33(7), 1025-1041.
<http://doi.org/10.1080/13691830701541556>
- Toulemon, L. (2004). Fertility among immigrant women: new data, a new approach. *Population & Societies*, 400. Retrieved from
http://www.ined.fr/en/publications/pop_soc/bdd/publication/540/

- Toulemon, L. (2006). *Fertility Among Immigrant Women in France: New Data, a New Approach*. Prepared for Population Association of American 2006 Annual Meeting, Los Angeles, California, March 30-April 1, 2006.
- Toulemon, L., & Mazuy, M. (2004). *Comment prendre en compte l'âge à l'arrivée et la durée de séjour en France dans la mesure de la fécondité des immigrants?* INED. Retrieved from http://www.ined.fr/fichier/t_publication/1053/publi_pdf1_120.pdf
- Tromans, N., Natamba, E., & Jefferies, J. (2007). Have women born outside the UK driven the rise in UK births since 2001? *Population Trends*, 136, 28–42.
- UN. (1998). *Recommendations on Statistics of International Migration: Revision*. New York: Department of Economic and Social Affairs, Statistics Division, United Nations. Retrieved from http://unstats.un.org/unsd/publication/SeriesM/SeriesM_58rev1E.pdf
- UN. (2013a). *International Migration Report 2013*. Retrieved from http://www.un.org/en/development/desa/population/publications/pdf/migration/migrationreport2013/Full_Document_final.pdf
- UN. (2013b). *World Population Policies 2013*. United Nations Population Division - Department of Economic and Social Affairs.
- UN. (2013c). *World Population Prospects: The 2012 Revision*. New York: United Nations Population Division. Retrieved from <http://esa.un.org/wpp>
- UN. (2014). *World Fertility Report 2013: Fertility at the Extremes*. Retrieved from <http://www.un.org/en/development/desa/population/publications/pdf/fertility/worldFertilityReport2013.pdf>
- UN. (2015). Population Policies Datasets. Retrieved April 2, 2015, from http://esa.un.org/PopPolicy/wpp_datasets.aspx
- Voas, D. (2009). The Maintenance and Transformation of Ethnicity: Evidence on Mixed Partnerships in Britain. *Journal of Ethnic and Migration Studies*, 35(9), 1497–1513. <http://doi.org/10.1080/13691830903125943>
- Waller, L., Berrington, A., & Raymer, J. (2012). Understanding recent migrant fertility in the United Kingdom. *CPC Working Papers*.
- Waller, L., Berrington, A., & Raymer, J. (2014). New insights into the fertility patterns of recent Polish migrants in the United Kingdom. *Journal of Population Research*, 31(2), 1–20. <http://doi.org/10.1007/s12546-014-9125-5>
- Walvin, J. (1984). *Passage to Britain: immigration in British history and politics*. Penguin in association with Belitha Press.
- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31(1), 105–125. <http://doi.org/10.1146/annurev.soc.29.010202.100026>
- Watkins, S. C. (1994). *After Ellis Island: Newcomers and Natives in the 1910 Census*. Russell Sage Foundation.
- Wilson, B. (2011, August 19). *Migrant fertility in England and Wales: Measuring fertility convergence* (Masters dissertation). London School of Economics and Political Science, London.
- Woldemicael, G., & Beaujot, R. (2012). Fertility Behavior of Immigrants in Canada: Converging Trends. *Journal of International Migration and Integration*, 13(3), 325–341. <http://doi.org/10.1007/s12134-011-0199-z>
- Yinger, J. M. (1981). Toward a theory of assimilation and dissimilation. *Ethnic and Racial Studies*, 4(3), 249–264. <http://doi.org/10.1080/01419870.1981.9993338>

- Young, C. M. (1991). Changes in the Demographic Behaviour of Migrants in Australia and the Transition between Generations. *Population Studies*, 45(1), 67-89.
- Zarate, A., & Zarate, A. U. de. (1975). On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. *International Migration Review*, 9(2), 115-156.
- Zumpe, J., Dormon, O., & Jefferies, J. (2012). *Childbearing among UK born and non-UK born women living in the UK*. ONS. Retrieved from http://www.ons.gov.uk/ons/dcp171766_283876.pdf

2. Defining and testing the convergence of migrant fertility

Abstract

Despite a long history of research on the convergence of migrant fertility, there is no consensus about the meaning of convergence in this context, or how it should be measured. Efforts to evaluate assimilation, adaptation, and the impact of migration on population growth may well be undermined by this lack of clarity. Paying particular attention to methodological implications, this paper establishes three broad definitions of migrant fertility convergence. It then explores the implications of these definitions by creating a conceptual typology based on the different reasons for studying the convergence of migrant fertility. This typology can be used to evaluate previous research, identify future research priorities, and guide the development of empirical research. It shows that previous research has failed to recognise the complexities that arise when studying convergence, and highlights the lack of research that has investigated convergence by studying the whole reproductive life course. By raising these issues, and showing how empirical research might be designed in order to address these concerns, this study provides a way forward for future research on migrant fertility.

2.1 Introduction

Since the end of the nineteenth century, demographers have investigated the differences in fertility between migrants and natives (Claghorn, 1901; Dumont, 1894, 1897; J. A. Hill, 1913; Kuczynski, 1901, 1902; Myers & Macisco, 1975). The concept of convergence can be used to describe how these differences might be expected to change over time. As such, convergence is predicted by some of the most prominent theories and hypotheses that have been used to explain migrant childbearing, including assimilation and adaptation. Although they do not always mention convergence explicitly, researchers have therefore investigated whether migrant fertility converges towards native fertility (or destination fertility norms) in a variety of settings, and using a range of different methods (e.g. Dumont, 1894; Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969; Goldstein & Goldstein, 1983; Hervitz, 1985; J. A. Hill, 1913; L. E. Hill & Johnson, 2004; Kulu, 2005; Lorimer, 1956; Myers & Macisco, 1975; Sobotka, 2008; Zarate & Zarate, 1975).

Although studies of migrant fertility convergence share a common interest in the intersection between migration and fertility, they can be characterised by three broadly distinct research motivations. In general, researchers are primarily interested in either: (1) understanding population growth, (2) theorising and explaining fertility, or (3) theorising and explaining migration.

In some studies of migrant fertility convergence, the aim is to understand the contribution of migrant fertility to population growth and population composition, via national and sub-national fertility rates (e.g. Edmonston, 2010; Espenshade, 1986; Jonsson & Rendall, 2004; Sobotka, 2008). Here, the underlying motivation is often to plan for future population growth and the related needs of a given population, including health services, education, benefits, pensions, or poverty alleviation. Knowledge of population growth may help policy-makers to manage the size of the future population

through migration policy, including efforts to counteract low fertility (Lutz & Scherbov, 2002; Morgan & Taylor, 2006). Migrant fertility can also have an enduring impact on population composition due to the timing of migrant births and the demographic characteristics of their children (Murphy, 1995; Waldorf, 1999). In particular, migrant fertility convergence can affect the age structure of the future economically active population, which implies that knowledge about this convergence can help policy-makers to manage the impacts of migration, including those relating to population ageing.

As opposed to focussing on population growth, researchers often study migrant fertility convergence because of an interest in either fertility theories or migration theories. With respect to fertility, migrant fertility convergence is of interest when researchers are trying to explain the determinants of fertility, in particular exposure to cultural norms (e.g. Fernandez & Fogli, 2006), or when they are trying to understand aspects of the demographic transition (e.g. Ben-Porath, 1980). Knowledge of migrant fertility convergence indicates whether migration alters the speed of the fertility transition (for migrant groups), and informs the relationship between migration and global demographic convergence (which predicts that fertility is becoming the same across all countries of the world) (Coleman, 1994; C. Wilson, 2001).

With respect to migration, studies of migrant fertility convergence are usually motivated by an interest in assimilation, integration and acculturation (e.g. Kahn, 1994; Parrado & Morgan, 2008; Stephen & Bean, 1992). These theories make predictions about the effect of living in a given destination on migrant behaviours, including their partnership and fertility (Alba & Nee, 2005; Massey, 1981; Portes & Zhou, 1993; Waters & Jiménez, 2005). As such, researchers are keen to investigate whether exposure to destination culture (or alternatively, the maintenance of ancestral culture) has an influence upon the convergence of migrant fertility toward a mainstream norm (e.g. Adserà et al., 2012; Coleman, 1994; Goldstein & Goldscheider, 1968; Kahn, 1988; Stephen & Bean, 1992). An understanding of this type of convergence helps to explain and

predict differences between migrant and native fertility, but it is of broader interest to migration researchers because it relates to the integration and incorporation of immigrants and their descendants. Research frequently aims to contrast the experiences of different groups of migrants, including their fertility, alongside other assimilation processes like social mobility or language acquisition (e.g. Massey, 1981). As well as contributing to an understanding of migration theory, this helps to inform policies that promote social cohesion and support the lives of migrants and minority groups.

Given all of these motivations, it is therefore unsurprising that convergence is discussed throughout the literature on migrant fertility, both explicitly (early examples include: Goldscheider, 1965, 1967; Spengler, 1931a, 1931b), and implicitly (for example with reference to assimilation and adaptation: Abu-Lughod, 1961; Carpenter, 1927; J. A. Hill, 1913; Hutchinson, 1961; Lorimer, 1956). In applied research on migrant fertility, there is often an overlap between references to convergence and references to similar concepts like assimilation, adaptation, socialisation, and acculturation. This overlap is sometimes stated explicitly (e.g. Dubuc, 2012), or acknowledged in the wording of hypotheses (e.g. Stephen & Bean, 1992), but there is no consensus about how to define migrant fertility convergence or what this concept means.

In fact, the concept of convergence is often applied to migrant fertility without reference to the varied and ambiguous meanings that have been attached to it in previous research. For example, a recent study of migrant fertility in Europe states that *"a case of a complete convergence has not thus far been recorded"* (Sobotka, 2008, p. 231). However, it remains unclear what 'complete convergence' means and how it can be measured empirically. Indeed, this lack of clarity may explain why this statement seems at odds with the conclusions of earlier research on Western Europe, which states that: *"Convergence with the fertility of the host society has been achieved by almost all Mediterranean populations"* (Coleman, 1994, p. 122). In rare cases, research alludes to the fact that convergence may have multiple meanings, for example by suggesting that

assimilation can occur either among immigrants or across generations (e.g. Parrado & Morgan, 2008). However, research has yet to make the diversity of meanings explicit, or to explore the ramifications of different convergence definitions for studies of migrant fertility.

This article aims to take a critical approach to these issues by deriving explicit definitions of migrant fertility convergence. It then explores the implications of these definitions by establishing a conceptual typology of migrant fertility convergence. The aim of creating this typology is to demonstrate the many ways that researchers might study convergence if they are interested in migrant fertility. This includes a discussion of the typology's implications, including how each type of convergence can be tested empirically, how it relates to the empirical evidence from previous studies, and what it implies for the design of future research.

The first section of this article defines the foundational concept '*convergence*', and then evaluates what happens when we add the qualifiers '*migrant*' and '*fertility*'. The analysis begins with this approach because there is no clear or agreed definition in the literature on how to conceptualise migrant fertility convergence. Three broad definitions of *migrant fertility convergence* are established as a result of this first analytical step. The second step then considers how these definitions can be applied by researchers given their different motivations for studying migrant fertility convergence. This step results in the creation of a convergence typology that describes the different approaches that can be taken when trying to measure and evaluate migrant fertility convergence. This is important because crude definitions do not provide sufficient detail to locate important gaps in knowledge or develop the most appropriate research designs to address them.

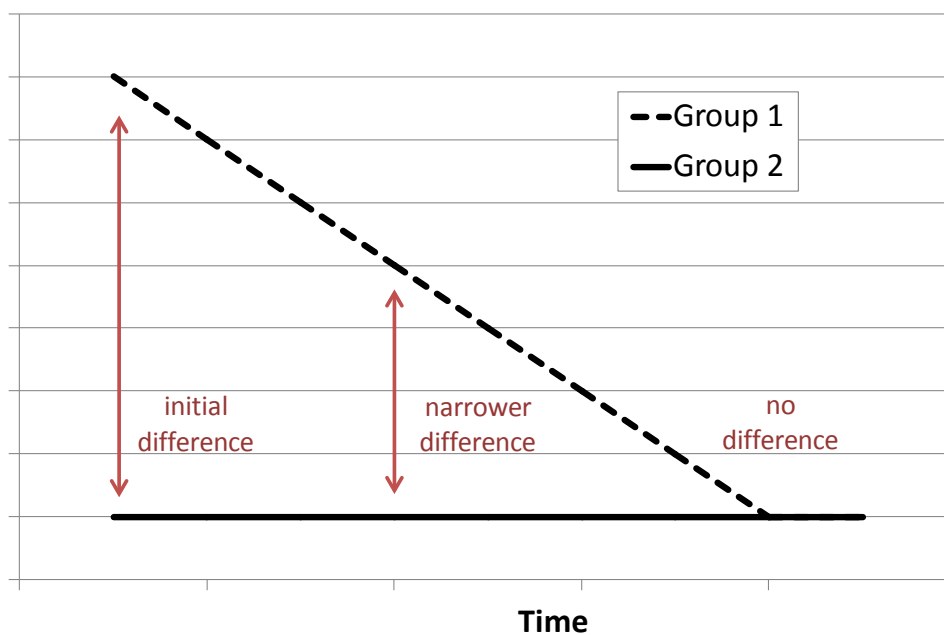
2.2 Defining the concept

The first aim of this article is to clarify what is meant by migrant fertility convergence. As such, it makes sense to begin with ‘convergence’, and then evaluate what happens when we add the qualifiers ‘migrant’ and ‘fertility’.

2.2.1 Convergence

Definitions of convergence are essentially consistent across sources. For example, convergence is defined as: “movement directed toward or terminating in the same point (called the point of convergence)” (OED, 2014); or “a situation in which people or things gradually become the same or very similar” (Macmillan Dictionary, 2014). These definitions imply that convergence involves three stages, which are illustrated by figure 2.1. In the first stage, two groups are different in some way. In the second stage, the difference between these groups is smaller than it was initially. And in the third and final stage, these groups become indistinct and remain in a state of equivalence. At this point, convergence may be assumed to be complete.

Figure 2.1: The three stages of convergence



Based on this definition, the empirical study of convergence requires that we can first establish a difference between two groups, and then assess how this difference changes over time. Moreover, although some indication of convergence might be provided in absence of evidence of stage three, it cannot be confirmed without evidence of all three stages.

2.2.2 Fertility convergence

What happens when we add the qualifier ‘fertility’ to the concept of convergence? Building on the three stages outlined above, fertility convergence can be defined as a situation where the initially different fertility of two individuals or groups gradually and irreversibly becomes the same. However, this immediately raises the question of what we mean by fertility. Demographers define fertility as the childbearing behaviour of individuals, couples, groups, or populations (Demeny, 2003; Pressat, 1985). But childbearing is a unique social process, and it is important to highlight its distinctive properties because they have implications for the way that fertility convergence is conceptualised.

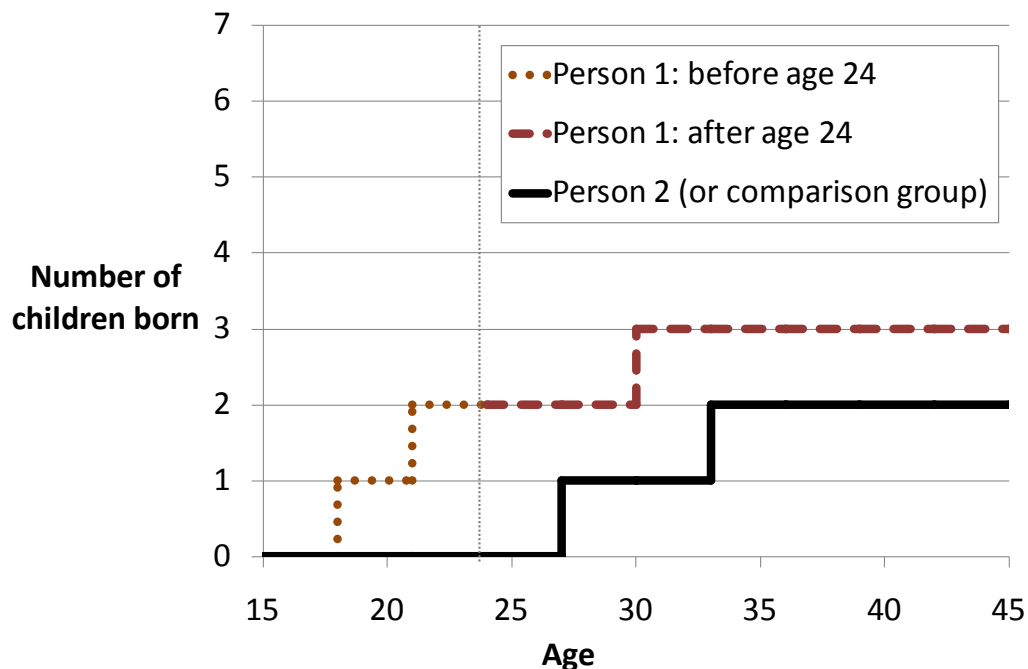
In the context of migration research, the distinct nature of fertility can be observed by comparing it with other assimilation outcomes, such as residential segregation, political participation, intermarriage, language use, education, income, and social mobility (Alba & Nee, 2005; Massey, 1981; Waters & Jiménez, 2005). There are similarities between some of these outcomes, but fertility appears to be distinct as the only one that naturally involves a long-run weakly monotonic process of exposure to rare events. For example, income or wages are not monotonic, and may either rise or fall, whereas the transition to a first birth cannot be reversed, and the number of births experienced over an individual life course cannot decrease. Fertility also appears to be distinct due to its (biological) restriction to a particular stage of the adult life course.

The specific nature of the fertility process has implications for the measurement and evaluation of fertility convergence. In addition to being

distinct from other social processes, fertility is multidimensional. This is acknowledged by demographers when they distinguish between fertility *quantum*, which refers to the number of children born, and fertility *tempo*, which refers to the timing of children born (e.g. Bongaarts & Feeney, 1998). Childbearing behaviour can therefore be measured and summarised in different ways, which means that fertility convergence could refer to fertility profiles, completed fertility, or some other measure of childbearing.

Fertility convergence can also refer to either individuals or groups, although it is difficult to envisage how the fertility of two individuals can unambiguously converge over their reproductive lives. Figure 2.2 indicates the difficulty with assessing fertility convergence at the individual level. It describes the fertility profiles of two individuals, although similar issues arise if we consider person 2 to be a comparison group instead.

Figure 2.2: A stylised example to consider whether fertility can converge across an individual life course



Note: Person 2 has no children up to age 27.

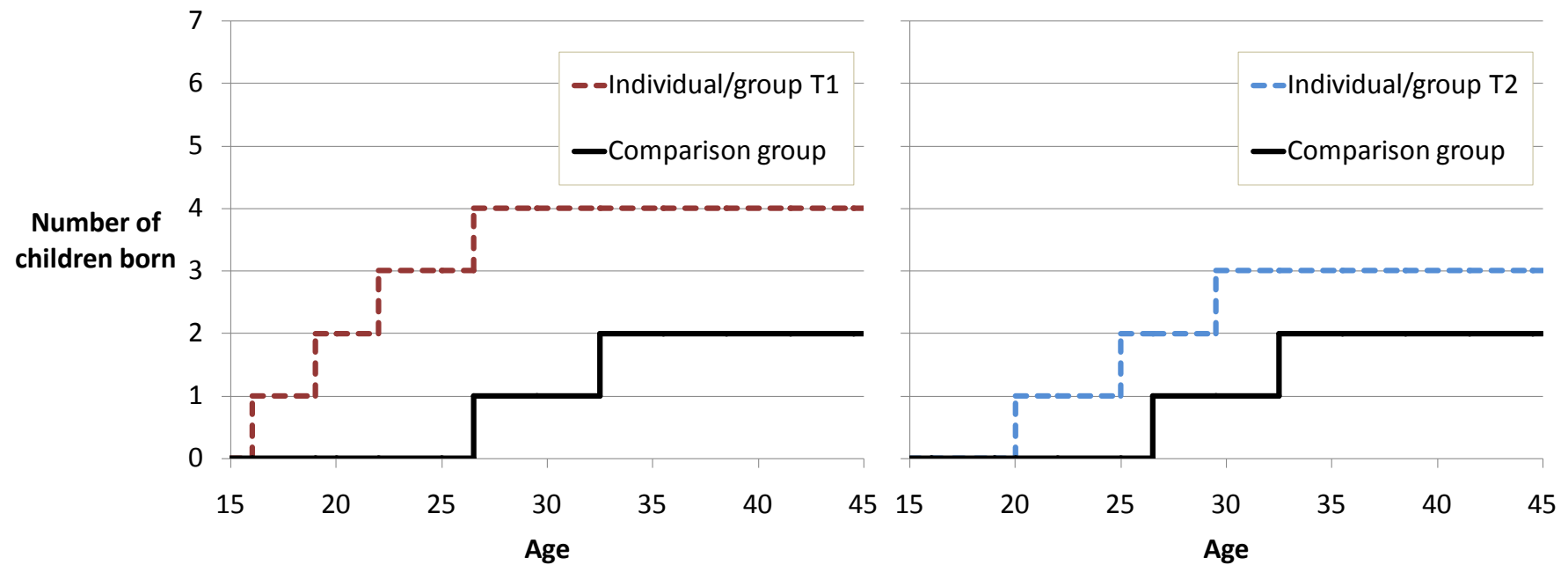
At the beginning of their reproductive lives, there is no initial difference between person 1 and person 2 in their number of children born, (or in any

measure of fertility). Instead, we might consider a later reference point, after childbearing has commenced. At age 24, there is difference of two children ever born. Taking this as the initial difference, there is a comparatively smaller difference of only one child at age 45. The initial difference has narrowed, fulfilling stages one and two of our convergence definition, but completed fertility is not the same, so stage three has not occurred, and cannot occur if we assume that fertility is complete.

It is hard to imagine how individual convergence can occur if the initial difference is calculated after childbearing has commenced. Of course, there are many alternatives to figure 2.2. For example, if person 2 had no more children after age 24 then it could be possible to say that some kind of convergence of completed fertility has occurred (because person 1 and 2 would both have two children at age 45). But this would still be ambiguous and hard to generalise. The equivalence at age 45 would be due to different childbearing behaviour in the period from 24-45, and this difference could be interpreted as evidence against the final stage of convergence. Perhaps more importantly, if this is considered to be convergence, then it would mean that convergence with person 2's completed fertility (of two children) would be impossible if person 1 had three or more children by age 24 (instead of the two children shown in the figure 2.2).

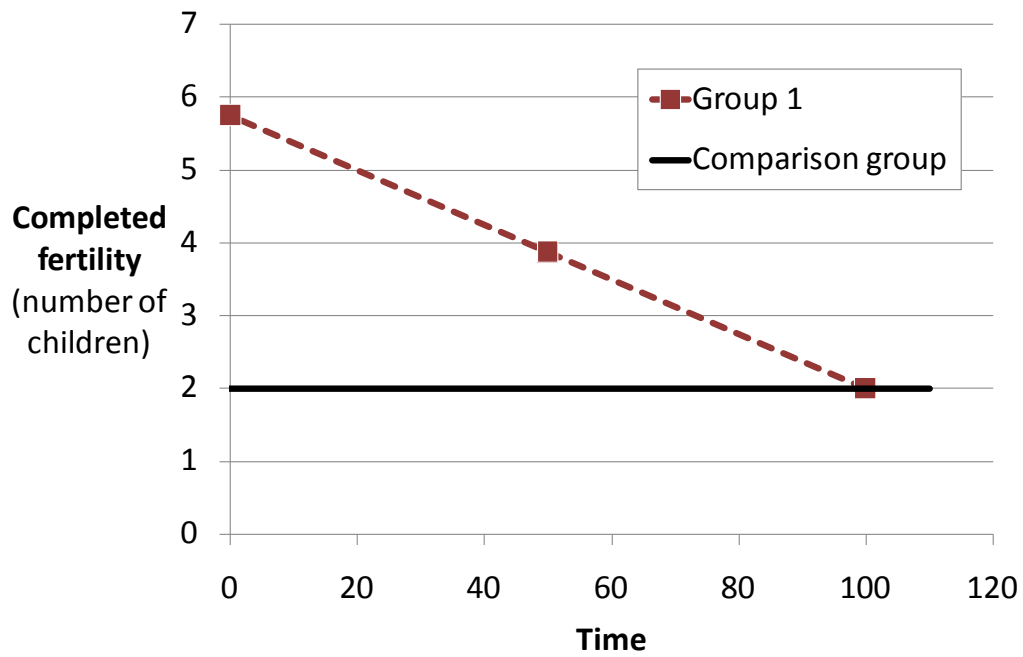
We have yet to consider what this means when studying migrants, but it may be worth noting here that the same issues arise if we consider person 1 to be a migrant who arrived at age 24, and person 2 to represent the native fertility norm. In any case, whether studying migrants or not, it would appear that fertility convergence cannot be established unambiguously over the reproductive life course of a single individual. However, this does not mean that fertility convergence is impossible to investigate. It can also be studied by examining the fertility of different groups or different pairs of individuals, and seeing how this varies over time. Examples of how this might be done are shown in figures 2.3a-c.

Figure 2.3a: A stylised example to show what convergence of fertility profiles might look like (comparing the two charts)



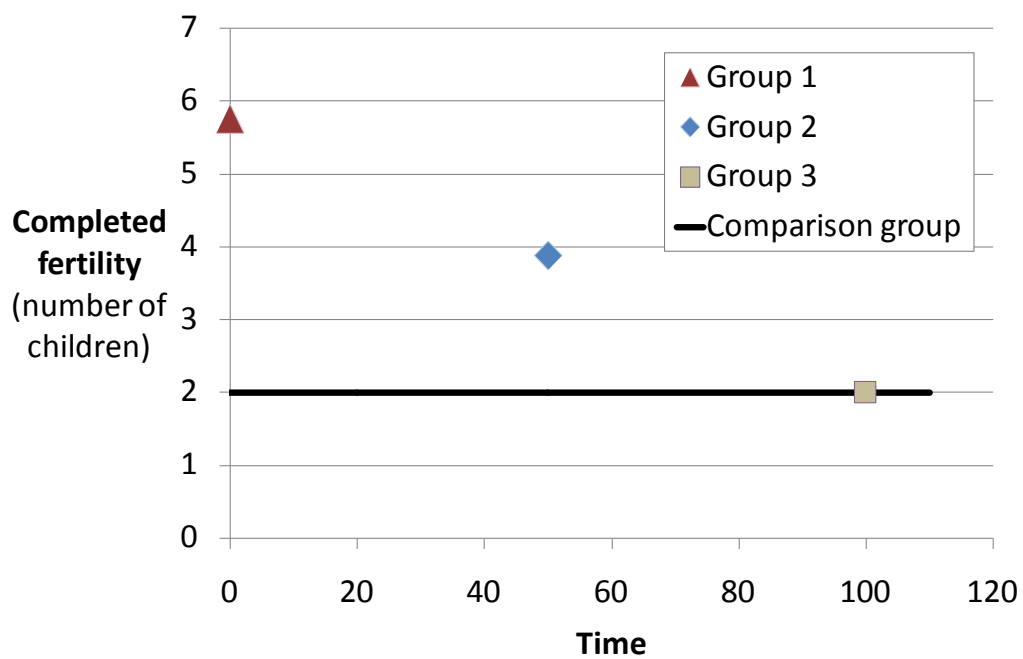
Note: The three stages of convergence are described in the text. This figure shows the first two, the initial difference (left-hand chart), and a narrowing of this difference (right-hand chart).

Figure 2.3b: A stylised example of completed fertility convergence over time



Note: The three squares represent the three stages of convergence.

Figure 2.3c: A stylised example of completed fertility convergence over time and generations



Note: Each stage of convergence is represented by one of the groups (1-3).

Figure 2.3a provides a stylised example to show what the convergence of fertility profiles might look like. The initial difference, stage one, is equal to the difference in fertility profiles between one individual or group, T1, and a comparison group. A narrowing of this difference, stage two, compares the profiles of a different individual or group, T2, and the same comparison group. Although stage 3 is not shown in figure 2.3a, convergence would be complete if there was no difference between the profiles of the comparison group and another individual or group, T3. There are various permutations of individuals and groups that might be referred to by figure 2.3a. For example, and to pre-empt a discussion of migrant fertility convergence, we might consider that T1, T2, and T3 each represent consecutive birth cohorts of immigrants from a particular origin (e.g. India), and the comparison group is represented by equivalent cohorts of natives from the destination (e.g. the UK). In this case, each of these groups (including the comparison group) would be composed of different individuals.

As opposed to the entire fertility profile, the concept of fertility convergence might be used to refer to completed fertility. Figures 2.3b and 2.3c provide two stylised examples to show what this might look like, where the three markers correspond to the three stages of convergence. Figure 2.3b shows an initial difference in completed fertility between two groups (group 1 and a comparison group), which becomes smaller over time until both groups have the same number of children. Given that there can only be one value of completed fertility per person, each group contains different people, but the groups are expected to have the same membership criteria. For example, we might compare first generation migrants (as group 1) with natives (as the comparison group), using birth cohort as the dimension of time on the x-axis.

Figure 2.3b can be contrasted with figure 2.3c, which shows a similar comparison over time, but for three different groups. This could be referred to as convergence over groups, although the most obvious illustration in relation to migrant fertility is convergence over migrant generations. For example, we

might calculate the initial difference between the first generation (group 1) and natives (the comparison group), and then compare this with the differences for the second generation (group 2), and third generation (group 3). Irrespective of how these groups are defined, an essential point is that this is different from figure 2.3b.

As illustrated by figures 2.3a-c, fertility convergence can refer to fertility profiles or completed fertility, but it can also refer to other aspects of childbearing, including birth timing. For example, the y-axes in figures 2.3b and 2.3c could be changed to 'age at first birth' to consider the convergence of birth timing, either over time (focused on Group 1) or over groups (Groups 1, 2, and 3).

2.2.3 Migrant fertility convergence

Building on the definitions we have already established, migrant fertility convergence can be defined as: *a situation where migrant fertility is initially different from, and then gradually becomes the same as, the fertility of someone else.* The problem with this definition is that, similar to fertility, the term 'migrant' can be interpreted in different ways. The comparison group 'someone else' is also ambiguous, and its definition will no doubt be linked to the way in which migrants are defined.

The way that 'migrant' is interpreted will depend upon the aims and objectives of a given piece of research, and this dependency is explored in more detail in the next section (2.3). In defining convergence, one important distinction is whether it refers to individual migrants or groups of migrants. This distinction is highlighted by Alba and Nee when they establish a general definition of assimilation (1997). It has also been described in relation to migrant fertility by Parrado and Morgan, who note that fertility convergence can either occur among individual migrants, due to exposure to their destination, or across migrant generations, similar to a comparison of immigrants with their children (2008).

The qualifier 'migrant' may therefore refer to individual migrants or groups of migrants, but there are also different ways that groups of migrants can be distinguished. The most common are by ancestral origin (e.g. Jamaicans) or by migrant generation (which are usually distinguished according to country of birth, age at arrival, and parental country of birth). For example, the first generation are those who are foreign-born, whereas the second generation are born at the destination but have at least one foreign-born parent. Using these, and more nuanced definitions, migration researchers often rank migrant generations according to their comparative exposure to a given destination (e.g. Alba & Nee, 1997; Bélanger & Gilbert, 2006; Haug, Compton, & Courbage, 2002; Portes, 1996; Smith, 2003; Young, 1991).

Considering these different ways of defining migrants, we propose three conceptual categories of migrant fertility convergence: (a) convergence over time, (b) convergence over generations, and (c) convergence over exposure to destination. The first of these, migrant fertility convergence over time, refers to *'a situation when the fertility of a group of migrants is initially different from, and then gradually becomes the same as, the fertility of a destination population'*. In this case the migrant population can be defined in many different ways, for example using a combination of origin and generation (e.g. first generation Indians). Alternatively, researchers may be interested in convergence for a particular ancestral group over generations. In this case, migrant fertility convergence refers to *'a situation when the fertility of a specific generation of migrants is initially different from, and then gradually becomes the same as, the fertility of a destination population, over subsequent generations'*. The third conceptual category we propose is migrant fertility convergence over exposure to a destination, which refers to *'a situation when the fertility of an individual migrant is initially different from, and then gradually becomes the same as, the fertility of a destination population, over exposure to the destination'*.

In proposing these three conceptual categories, our intention is not to argue that they are definitive or exhaustive definitions of migrant fertility

convergence. Instead, the aim is to acknowledge, and make explicit, the different types of convergence that researchers might consider, in particular for the design and interpretation of empirical research. As the next step in this process, we consider the implications of different definitions by constructing a conceptual typology. The aim of this typology is to demonstrate the ways in which convergence can be studied by researchers who are interested in migrant fertility.

2.3 A typology of convergence and its implications

As discussed in the introduction, there are different motivations for investigating migrant fertility convergence. In general, researchers are primarily interested in either: (1) understanding population growth, (2) theorising and explaining fertility, or (3) theorising and explaining migration. So what is meant by convergence will depend upon the specific aims of a given piece of research.

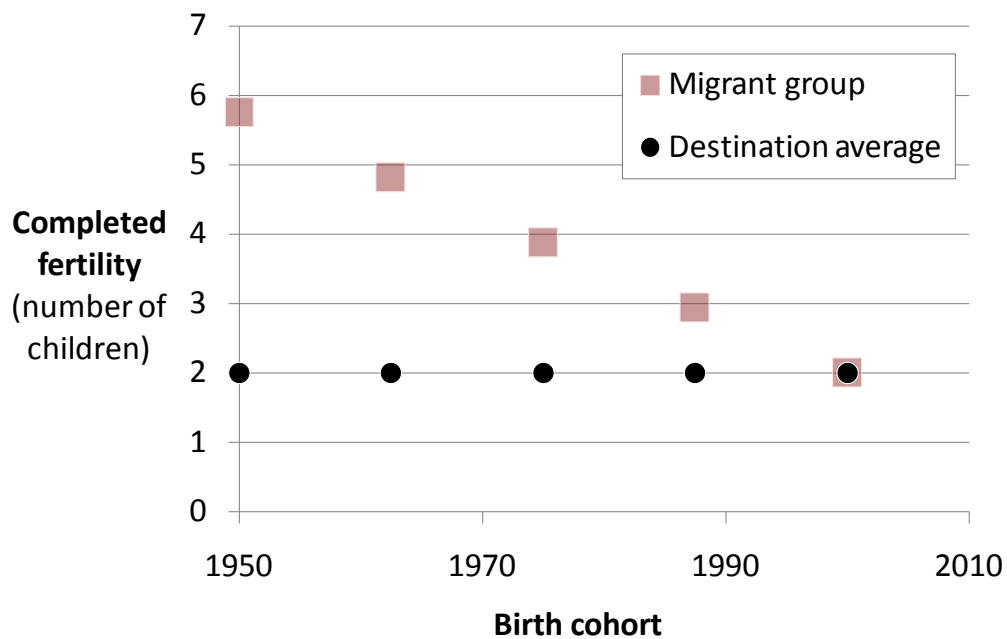
As we have established, there are several choices that need to be made when conceptualising convergence, including: how to measure fertility, how to define migrants, and how to define the comparison group. In the following sections, we consider these choices alongside the different motivations for studying migrant fertility convergence. In doing so, we discuss the approaches that can be taken when trying to measure and evaluate convergence, and thereby create a typology of convergence that can be used to identify gaps in knowledge and develop new empirical research. A summary of this typology is given in appendix table A2.1.

2.3.1 Population growth

If researchers are aiming to understand the relationships between migrant fertility and population growth, then they are most likely to be focused on fertility with respect to population size. This suggests that completed fertility is the ideal measure for analysis because it quantifies the total number of children that an individual has over their entire life course, and hence represents their contribution to the size and growth of the population, (both now and in the future). Researchers are typically interested to know how this contribution to population growth varies between migrants and natives. If they choose to investigate migrant fertility convergence, then this means that researchers might choose to focus on either convergence over time or convergence over generations.

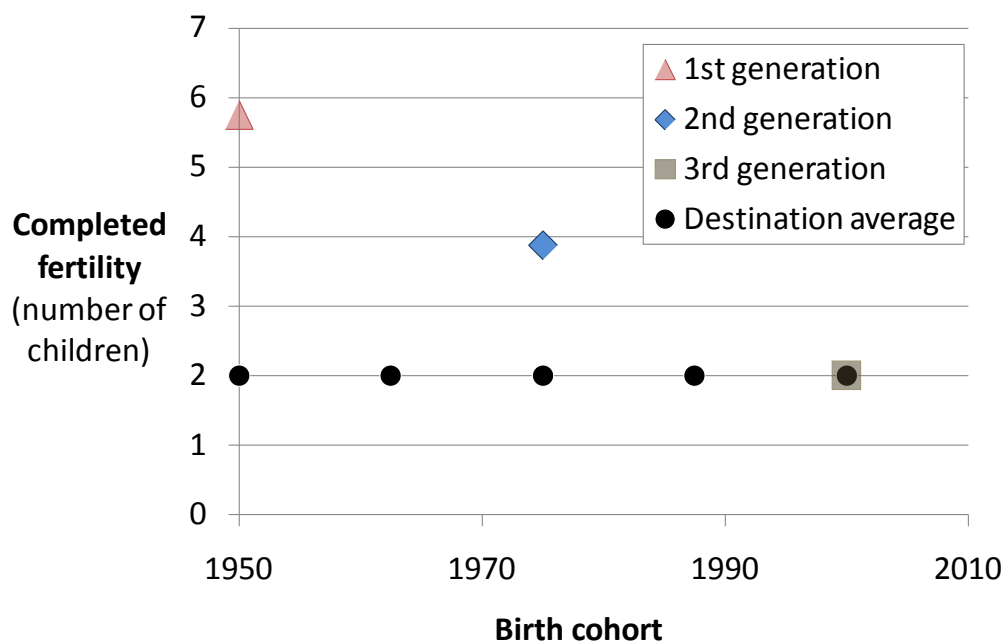
With respect to population growth, an assessment of convergence over time would therefore consider differences between the completed fertility of a migrant generation, or generational subgroup, as compared with the average completed fertility of their destination. On the other hand, an assessment of convergence over generations would consider changing patterns of differences between the completed fertility of subsequent generations of migrants and the destination average. In both cases, an appropriate comparison group is one that represents this destination average, chosen to match the national or sub-national area of interest. Ideally, this group would exclude migrants (i.e. it would represent only 'ancestral' natives), although differences between migrants and the destination should still be evident if this is not the case.

Figure 2.4a: Understanding the contribution of migrant fertility to population growth through a study of convergence over time



Note: The third stage of convergence is reached by those born in 2000.

Figure 2.4b: Understanding the contribution of migrant fertility to population growth through a study of convergence over generations



Note: The third stage of convergence is reached by the third generation.

Examples of these types of convergence are shown in figures 2.4a and 2.4b. In both examples, birth cohort is the unit of time over which convergence is assessed, and the destination average is used as the comparison group. The main difference between the examples is that figure 2.4a focuses on a specific migrant group and considers the changes in its completed fertility over time, whereas 2.4b considers how convergence varies over both time and generations. This is similar to a comparison of immigrants with their children, and indicates the relative contribution that the descendants of migrants make toward population growth, as compared with their parent's generation.

When investigating the links between convergence and population change, researchers may also want to consider the influence of changing patterns of migration and the changing composition of the migrant population. For instance, migration may become more selective over time, due to self-selection or changes in migration policy. This could result in the increasing exclusion of migrants from high fertility countries, and a corresponding convergence of migrant and native fertility. Studies of convergence may help to explain these compositional changes.

One way to investigate the changing composition of the migrant population is to make migrant and native groups more comparable and then establish whether this leads to changes in patterns of convergence. For example, convergence over time could be assessed for migrants and natives with the same levels of education (e.g. through the appropriate use of standardisation or regression), and compared to an analysis that ignores education. Any difference might therefore be explained by changing differences in education between migrants and natives.

In broad terms, this approach can be used to investigate a range of different factors, and applied to most types of convergence that are discussed here. But even in the absence of other explanations, studies of convergence can suggest whether convergence is or is not occurring, and thereby provide findings that can be explained by further research.

The types of convergence established in this section (and demonstrated by the examples in 2.4a and 2.4b) can be contrasted with previous studies of migrant fertility, in particular those that have stated an interest in population growth. In this way they can be used to help interpret the existing body of knowledge, and offer guidance for the design of future research. Previous research has often focused on the contribution of first generation migrants to population growth by comparing the period Total Fertility Rates (TFRs) of women by nativity, citizenship, or ethnicity (e.g. Bélanger & Gilbert, 2006; Coleman & Dubuc, 2010; Iliffe, 1978; Ng & Nault, 1997; Roig Vila & Castro-Martín, 2008; Sobotka, 2008; Toulemon, 2004; Tromans, Natamba, & Jefferies, 2007; Westoff & Frejka, 2007). In a few cases, these comparisons have distinguished between migrant origin countries and considered a time series of period TFR differences (e.g. Abbasi-Shavazi & McDonald, 2000; Coleman, 1994). However, as Parrado has shown for Hispanic and Mexican migrants in the US (2011), the analysis of period TFRs can indicate that there are material differences between the fertility of migrants and natives, even when there are no (or only very small) differences in completed fertility. As we have shown, the assessment of convergence relies upon an assessment of differences, and when combined with Parrado's findings, this suggests that we may need to be cautious when interpreting some previous research. It also suggests that there is a need for more research that studies convergence using completed fertility.

Some research has come close to an assessment of completed fertility convergence over time. For example, there are studies that have compared children ever born by country of birth at two different time points (e.g. Blau, 1991; Kahn, 1994). There are also studies that have estimated the number of children ever born for different cohorts of female migrants by country of birth. These studies have estimated the completed and partially completed fertility of migrants in various destinations, including Australia (Day, 1984; Young, 1991), the Netherlands (Alders, 2000; Fokkema, de Valk, de Beer, & Van Duin, 2008; Garssen & Nicolaas, 2008), Greece (Bagavos, Tsimbos, & Verropoulou, 2007), Canada (Ram & George, 1990), France (Toulemon & Mazuy, 2004), Israel

(Friedlander & Goldscheider, 1978), and the US (Parrado, 2011). However, only a few of these studies have assessed the same type of convergence over time that is described here (in figure 2.4a) (e.g. Young, 1991: Table 3). The majority of research does not include an explicit evaluation of fertility differences between migrant groups and the destination. In addition, almost all analyses include some migrants who are at risk of further births (e.g. those under 40-years-old). This means that it is uncertain, for these migrants, whether patterns of convergence would remain the same if their future births were included in the analysis. Of course, one way around this issue is to assume that differences between migrants and natives will remain constant across the fertility profile. However, there does not appear to be any research that supports this assumption.

Similarly, there is a lack of research that has considered the convergence of completed fertility for the descendents of migrants, either by focussing on a single generation (e.g. using figure 2.4a to investigate convergence over time for the second generation), or by focusing on convergence over generations (figure 2.4b). This is perhaps surprising given that the first study to explore second generation fertility was more than 100 years ago (J. A. Hill, 1913). However, research on migrant generations is often restricted by a lack of data that allows second and later generations to be distinguished.

In studies that have explored second generation fertility, they have typically analysed samples where most women have not completed their childbearing (e.g. women aged 15-45) (L. E. Hill & Johnson, 2004; Milewski, 2010a, 2011; Scott & Stanfors, 2011). Again, this may relate to a lack of data, or the existence of only small numbers of second generation women whose fertility is complete (e.g. because large-scale immigration is a recent phenomena for many countries). In turn, this suggests that there is a need, both now and in the future, for more data to be collected on ancestral country of birth.

There is a small body of research that has explored the convergence of completed fertility over generations, similar to the example shown in figure 2.4b, but this has focused on migrants and the descendants of migrants from single origins to the US (Goldstein & Goldscheider, 1968; Parrado & Morgan, 2008; Rosenwaike, 1973). This suggests that there is a lack of research on other destinations, and a lack of research that compares this type of convergence for different origin groups at the same destination. There is some research on the cohort fertility of different migrant generations in Europe (e.g. Alders, 2000; Garssen & Nicolaas, 2008). However, this research does not analyse changes in differentials, or focus on the convergence of completed fertility over generations. Again, this suggests an avenue for further investigation.

2.3.2 Fertility

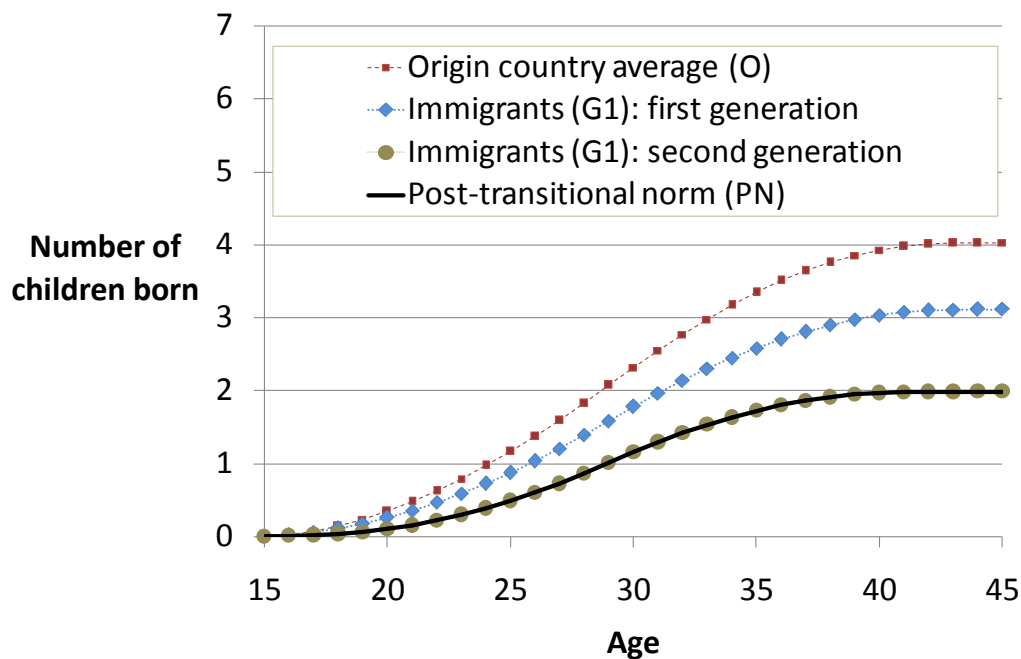
Instead of being primarily interested in population growth, researchers may choose to study migrant fertility convergence because their primary interest is fertility. There are a wide range of research questions that relate to fertility, but with respect to migrant fertility convergence, researchers are most likely to be interested in either the fertility transition, as part of the demographic transition, or the determinants of fertility that are specifically related to migrants and migration.

The fertility transition

In broad terms, the fertility transition refers to the fall in fertility rates that is predicted to occur in all countries as part of the demographic transition (Dyson, 2010). As suggested by Coleman, demographic transition theory is often relevant when applied to immigrants because it predicts that *"their demographic transition will be initiated or accelerated by the new environment, and that convergence with the demographic regime of the host society will take place, much faster than if the migrants had remained in the country of origin"* (Coleman, 1994, p. 110). This means that studies of migrant fertility convergence can help researchers to

understand how migration alters the speed with which migrants go through the fertility transition, particularly if compared with fertility at origin. This interest is related to the theory of global demographic convergence (Basten, 2013; Billari & Wilson, 2001; C. Wilson, 2001), which predicts an international movement toward common patterns of demographic behaviour. For fertility, the expectation is that countries will increasingly exhibit the same fertility rates, and the same timing of demographic events like age at first birth. Taken to its extreme, this suggests that all aspects of fertility will converge over time across countries, and that this will have a direct effect on migrant fertility.

Figure 2.5: Understanding the fertility transition through a study of convergence over generations



Note: In this example, the third stage of convergence is reached by the second generation.

Given these interests, researchers are most likely to want to investigate whether migrant fertility profiles converge over generations with the fertility profiles of a post-transitional population. An example of this is given by figure 2.5. In this example, there is an initial difference between the fertility profiles of an origin country (e.g. Nigeria), which has not yet completed the first demographic transition, and a post-transitional norm, which researchers might

estimate using the fertility norm of the destination (e.g. the UK). In the second stage of convergence, there is a narrower difference between an immigrant group (e.g. first generation Nigerians), as compared with the post-transitional norm. In this example, it is assumed that the third stage of convergence occurs because there is no difference between the profiles of the second generation and the post-transitional norm.

Comparing this example with previous studies of migrant fertility shows that there is a lack of previous research that has compared the fertility of migrants to both their origin population, and a post-transitional norm (e.g. the destination norm). Some research has carried out this comparison for Puerto Rican migrants in the US (Jaffe & Cullen, 1975; Singley & Landale, 1998), a range of migrant origins in Australia (Abbasi-Shavazi & McDonald, 2000, 2002), and a range of origins and destinations in Western Europe (Coleman, 1994). However, none of this research has examined fertility profiles, and this reflects a general lack of research on any type of migrant fertility convergence that has compared the profiles of migrant and natives over time. As mentioned in the previous section on population growth, there are some studies that have estimated the completed fertility of migrant groups by origin and generation. But there are only a small number that include an analysis of completed and partially completed fertility profiles (e.g. Alders, 2000; Bagavos et al., 2007; Friedlander & Goldscheider, 1978), and it seems that none of these studies have investigated convergence of these profiles over time, generations, or exposure to destination.

This lack of research is no doubt related to a lack of data, suggesting the need for more data to be collected that allows an analysis of the entire fertility profiles of migrants. In addition to collecting more migrant birth histories, it may also be prudent to begin collecting more prospective longitudinal data on new migrants. Unlike retrospective data, this would include migrants (and natives) who emigrate, return, or die.

Given a lack of data, it may also be valuable for research to evaluate whether it is appropriate to use partial measures of fertility profiles for the analysis of profile convergence. In order to answer this question, it is important to know how differences between migrant and native fertility vary across the entire fertility profile, including for different migrant groups. Such analysis may also indicate whether valid inferences about fertility profile convergence can be made when analysing samples that use measures of fertility that consider only part of the profile.

Indeed, researchers may argue that they are interested in the convergence of only part of the fertility profile, especially when this is justified by their objectives and the context of their research. When focused on the fertility transition, this might be relevant for convergence if the migrants and natives are from origins and destinations that are at a particular stage of the transition. At the beginning and middle of the transition, countries often exhibit a fast rate of change in completed fertility, as childbearing at older ages declines from initially high levels (Bongaarts & Casterline, 2013). As such, completed fertility might be chosen as the most suitable measure for the analysis of migrants from countries that are at the beginning or middle of the fertility transition. On the other hand, in cases where migrants and natives are from societies that have already experienced large falls in completed fertility, it may make sense to choose a fertility measure (and therefore a type of convergence) that is better suited to investigating the fertility transition in that context.

The determinants of fertility

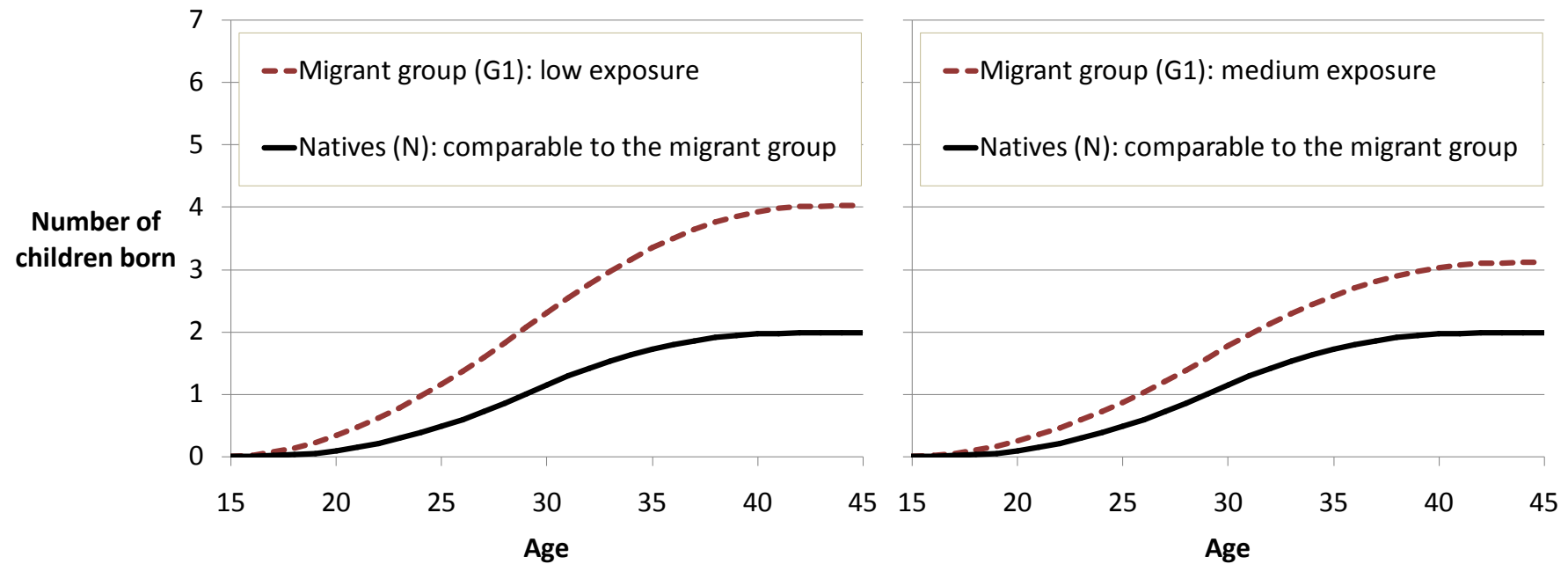
As opposed to the fertility transition, researchers may study migrant fertility convergence because they are primarily interested in the determinants of fertility. In this case, migrants are a useful population to study because they often exhibit considerable (and unique) variation in certain determinants, not only within migrant groups, but also as compared with natives. Most commonly, this means that researchers are interested in determinants of fertility

that are associated with exposure to destination, especially exposure to cultural norms (e.g. Bean & Swicegood, 1985; Coleman, 1994; L. E. Hill & Johnson, 2004).

Culture underpins many of the hypotheses that have been used to explain migrant fertility, including cultural maintenance, minority status, and socialisation (Abbasi-Shavazi & McDonald, 2000; Goldscheider & Uhlenberg, 1969; Goldstein & Goldstein, 1983; Hervitz, 1985). The importance of cultural explanations for the fertility of migrants and their descendants has also been shown in research on ethnic fertility differentials (e.g. Coleman & Dubuc, 2010; Fischer & Marcum, 1984; Forste & Tienda, 1996; Sorenson, 1985). Not all of these cultural explanations make explicit predictions about convergence. However, they do suggest that culture can have an important role in determining migrant fertility. This means that culture can determine differences compared with native fertility, and therefore influence convergence.

When focused on convergence as a means of studying fertility determinants, researchers are therefore most likely to consider how migrant fertility changes with increasing exposure to destination culture. However, they could be interested in any fertility determinant that varies by exposure to destination. This implies a type of convergence similar to figure 2.6a. There are many different ways that exposure to destination could be measured, either directly or indirectly. Some of the most commonly studied measures in previous research are duration of residence, language use, and residential concentration (Ford, 1990; Forste & Tienda, 1996; L. E. Hill & Johnson, 2004; Swicegood, Bean, Stephen, & Opitz, 1988).

Figure 2.6a: Understanding the determinants of fertility through a study of the convergence of fertility profiles over exposure to destination



Note: The three stages of convergence are described in the text. This figure shows the first two, the initial difference (left-hand chart), and a narrowing of this difference (right-hand chart). The third stage of convergence is not shown, but would be expected to occur for migrants who have a high level of exposure to the destination.

Figure 2.6b: Understanding the determinants of fertility through a study of the convergence of completed fertility over exposure to destination

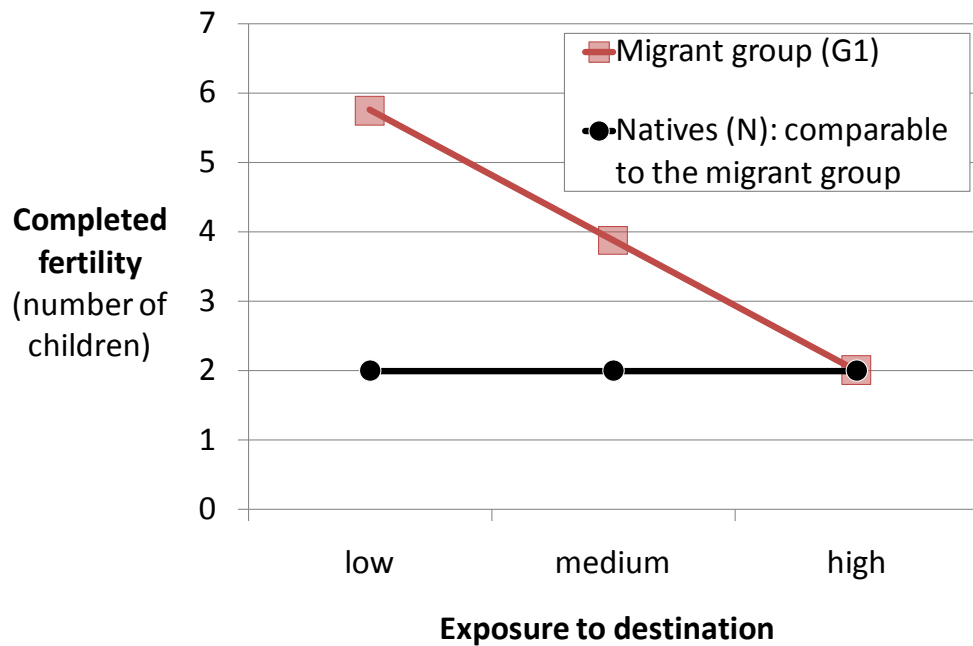
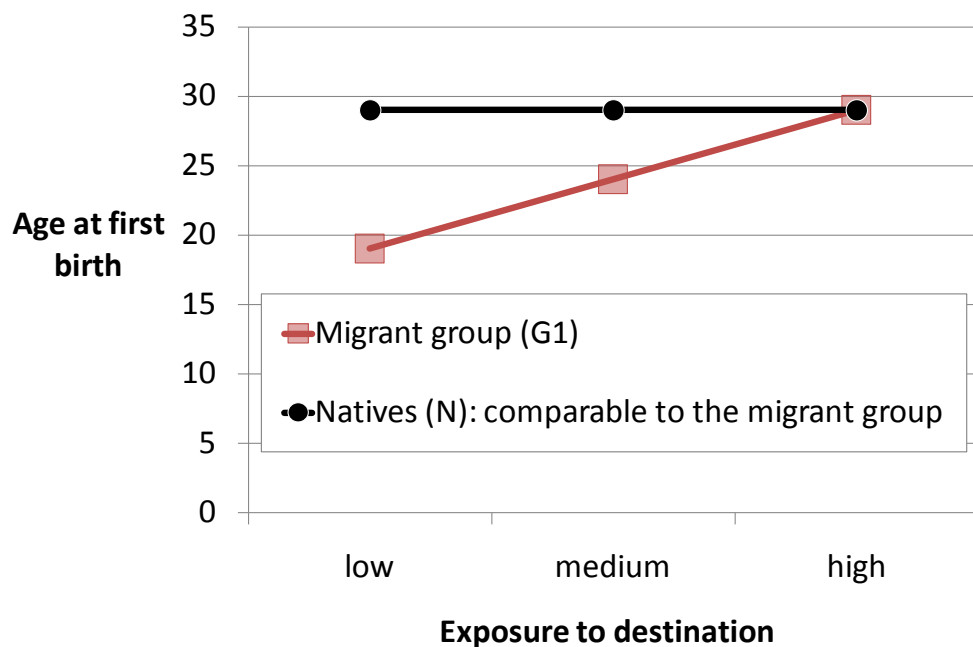


Figure 2.6c: Understanding the determinants of fertility through a study of the convergence of birth timing over exposure to destination



Irrespective of the determinant that is considered, researchers are more likely to observe a relationship with fertility, if it exists, by examining the whole fertility profile. This implies that profiles are the ideal measure for analysis. However, researchers may argue that they are interested in the convergence of only part of the fertility profile, or that they are constrained by a lack of available data. To show how research might proceed in this case, figures 2.6b and 2.6c give examples of convergence over exposure to destination for completed fertility and age at first birth. But regardless of the fertility measure, the ideal comparison group is natives who are as similar as possible to the migrant group under investigation. This is because, when investigating convergence over exposure to destination, researchers will be keen to ensure that observed patterns of convergence are due to exposure, rather than other determinants (i.e. confounding variables).

Comparing this type of convergence with previous research, there have been a number of studies that have analysed the association between exposure to destination and migrant fertility (Abbasi-Shavazi & McDonald, 2000; Andersson, 2004; Ford, 1990; Kahn, 1988, 1994; Mayer & Riphahn, 2000; Milewski, 2010b; Rumbaut & Weeks, 1986; Woldemicael & Beaujot, 2012). However, almost all of these studies have stated a primary interest in theories of adaptation and intergenerational assimilation, rather than the cultural determinants of fertility. There is some overlap between these interests, but as may become clearer in the following sections, they can imply different types of convergence. One conceptual difference is that adaptation refers to convergence over an individual life course, which implies that it should be evaluated by analysing how fertility behaviour changes within individuals due to increasing exposure to destination. On the other hand, researchers who are interested in the determinants of fertility may be interested in explaining macro-level fertility patterns due to differences between individuals (in exposure). In reality, empirical research may appear very similar, and in the case of adaptation (due to the peculiarities of fertility - see section 2.2.2), convergence may also need to

be investigated by examining variation between individuals (rather than within). However, this is only an indirect way of assessing adaptation.

Perhaps one other difference when investigating fertility determinants, rather than adaptation, is that researchers are likely to consider a broader range of measures of exposure. This conclusion is reinforced by research on the determinants of ethnic fertility, which proposes many different determinants that are worthy of investigation (e.g. Coleman & Dubuc, 2010; Fischer & Marcum, 1984; Forste & Tienda, 1996; Sorenson, 1985).

2.3.3 Migration

Many researchers who study migrant fertility convergence are primarily interested in explaining the behaviour of migrants. This implies that they aim to understand the changing behaviour of migrants in relation to destination norms. It also implies that fertility is only one of a range of social processes that might be of interest (Alba & Nee, 2005; Massey, 1981; Waters & Jiménez, 2005). For example, researchers may be simultaneously interested in the convergence of fertility, partnership behaviour and labour market outcomes (Bleakley & Chin, 2010). This interest in a range of outcomes is important to acknowledge when studying convergence due to assimilation because, as we have shown, fertility is not the same as many other social processes. For example, unlike income or wealth, fertility is weakly monotonic, and cannot fall over the life course of individuals. This means that empirical approaches that are applied to other assimilation outcomes may not be appropriate for studies of fertility.

Assimilation is not the only theory that is used to investigate migration, but it is the most relevant theory for studies of migrant convergence. To avoid giving the impression of consensus, it is important to acknowledge that assimilation is a contested concept and can be defined in different ways (Alba & Nee, 1997; Rudmin, 2003; Yinger, 1981; Zhou, 1997). Nevertheless, here we follow Alba and Nee in defining assimilation as: *“the decline, and at its endpoint the disappearance, of an ethnic/racial distinction and the cultural and social differences*

that express it" (1997, p. 863). This 'disappearance of a distinction' can be represented by the three stages of convergence that we have established, which explains why convergence is a prediction of assimilation theory. However, this then raises the question of what we mean by migrant fertility assimilation (the theory) and what type of convergence this implies (the prediction).

As Alba and Nee point out, there are different ways that assimilation can be conceptualised (1997). Firstly, assimilation can refer to convergence over an individual life course. When applied to migrant fertility this has typically been called adaptation (Milewski, 2010a). Secondly, assimilation can also refer to convergence across groups over time, which has usually been called intergenerational assimilation when applied to migrant fertility (Parrado & Morgan, 2008).

Based on this distinction we consider adaptation and intergenerational assimilation separately in the next two subsections. Before doing so, it is worth considering two decisions that apply to both types of assimilation, and the convergence they predict. The first is to decide which fertility measure is most appropriate. Researchers who are interested in assimilation may argue that it is appropriate to focus on part of the fertility profile, not least in situations where data are limited. However, given that assimilation refers to the 'disappearance of a distinction', we would argue that it is important to study the whole fertility profile, regardless of the type of assimilation that is considered. This is particularly imperative because convergence may occur for part of the profile (e.g. age at first birth) while the opposite occurs elsewhere (e.g. for completed fertility). Without knowledge of the whole fertility profile, less is known about assimilation, and any inferences beyond the measures that are used in a study may be inaccurate.

The second decision is to choose the comparison group for convergence due to assimilation. Although migrants will usually be compared with the 'mainstream' native norm, assimilation can also be assessed with reference to

the 'mainstream' norms of ethnic minorities, including migrant groups who are assumed to have assimilated (Alba & Nee, 1997).

Adaptation

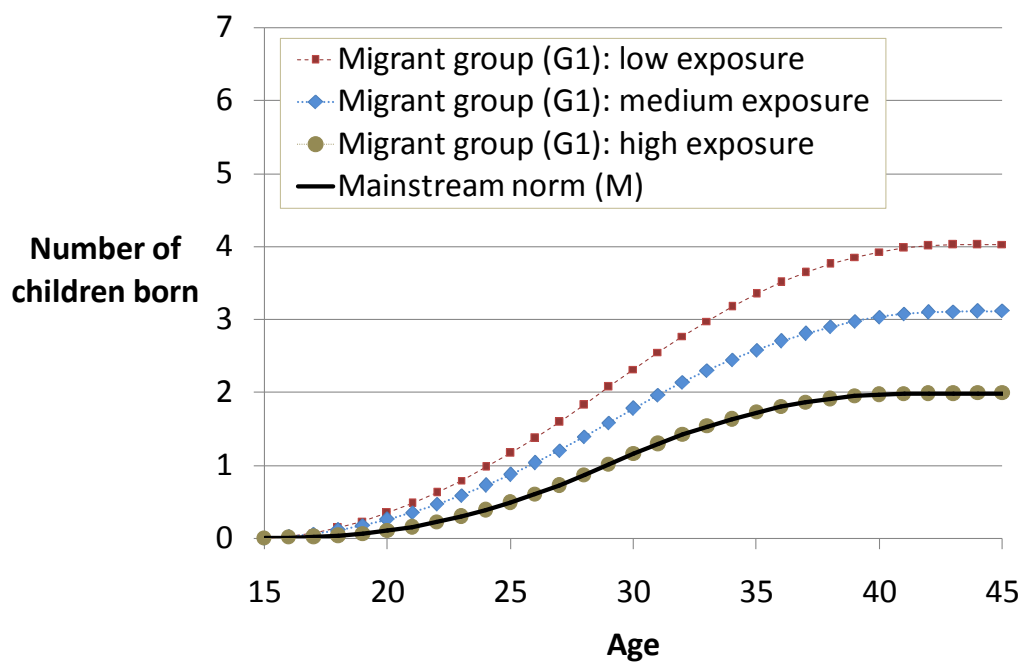
Adaptation is generally defined by demographers as a form of assimilation which predicts the convergence of a migrant's fertility behaviour toward the mainstream destination norm (Goldstein & Goldstein, 1983; Harbison & De Jong, 1980; Harbison & Weishaar, 1981; Milewski, 2010a). In the context of international migration, adaptation is usually applied to the analysis of first generation fertility (Abbasi-Shavazi & McDonald, 2000; Andersson, 2004; Ford, 1990; Kahn, 1988, 1994; Rumbaut & Weeks, 1986). For these immigrants, it predicts that convergence may begin at any point after arrival (but not beforehand), and is expected to occur to an individual migrant with increasing duration of residence (Milewski, 2007, 2010a). It is therefore a form of convergence over exposure to destination norms.

Although convergence over duration of residence may appear straightforward, there is a problem with testing this for fertility because, as we have already discussed, it is seemingly impossible to conceptualise fertility convergence at the individual level. For instance, some immigrants may arrive having already had more children than the mainstream norm for completed fertility. In this case, it is hard to imagine what individual convergence looks like because their number of children ever born cannot fall.

One way around this issue is to investigate adaptation indirectly, and to carry out an analysis of convergence that compares different individuals or groups. For an indirect analysis of adaptation it is particularly important to consider which generational group is most suitable. This might be adult migrants, child migrants, or second and subsequent generations. The decision is important because there are different challenges associated with evaluating convergence due to adaptation for each of these generational groups.

The distinction between adult and child migrants is that (most) child migrants arrive before their childbearing years begin, whereas adult migrants arrive during their childbearing years, and may have had one or more births prior to arrival (Abbasi-Shavazi & McDonald, 2000; Beck, Corak, & Tienda, 2012; Bélanger & Gilbert, 2006). To analyse the adaptation of adult or child migrants, we might conceive a type of ‘convergence over duration at residence’ that is shown in figure 2.7.

Figure 2.7: Understanding adaptation through a study of the convergence of fertility profiles over duration of residence



Note: This figure shows the three stages of convergence. In the third stage, the group of immigrants with a long duration have the same fertility profile as the mainstream norm.

This type of convergence appears straightforward to analyse, but it might be hard to interpret, especially for adult migrants. This is because the comparison of fertility profiles by duration of residence can be confounded by age at migration. For all immigrants, duration of residence is perfectly correlated (i.e. collinear) with age and age at migration. And for all convergence types, the comparison of fertility profiles implies holding age constant to compare the profiles at each age. This means that patterns of ‘convergence over duration at residence’ could be the result of variation due to age at migration,

rather than duration of residence, and this will be the case if age at migration is associated with fertility.

Previous research suggests that there is an association between age at migration and fertility prior to migration (e.g. Toulemon, 2004; Toulemon & Mazuy, 2004), and it is commonly theorised that some adult migrants may delay childbearing in anticipation of migration (Andersson, 2004; Bledsoe, Houle, & Sow, 2007; Chattopadhyay, White, & Debpuur, 2006; Hoem, 2014; Kulu, 2006; Nedoluzhko & Andersson, 2007; Toulemon, 2006). If anticipation is more prevalent among adults who migrate at certain ages, then this might result in fertility profiles that look like convergence due to adaptation, but are entirely unrelated to the experience of migrants after arrival.

Although previous research has analysed the fertility of adult migrants by duration of residence (or age at migration), it has rarely emphasised these issues of interpretation. This may be because fertility adaptation has rarely been explored using completed fertility profiles, thereby making the issues less apparent. For example, research has typically analysed samples of women who are at various stages of childbearing (e.g. aged 15-45) (Ford, 1990; Kahn, 1994; Rumbaut & Weeks, 1986), and/or focused on parity-specific analysis (e.g. Andersson, 2004; Milewski, 2007, 2010b). Nevertheless, the problems of identifying adaptation for adult migrants seem likely to be relevant regardless of the type of fertility that is analysed, although further research would be required to confirm this.

Having considered the difficulties of analysing adaptation for adult migrants, an analysis of child migrants may be preferable. Some studies have focused on the adaptation of child migrant fertility, but they have not studied fertility profiles (Adserà & Ferrer, 2014; Adserà et al., 2012). As such, this suggests an avenue for new research. Further research might also seek to clarify whether adaptation can be tested for second and later generations. Although second generation adaptation has been discussed in previous research (Abbasi-Shavazi & McDonald, 2000; Milewski, 2010a; Scott & Stanfors, 2011), this is

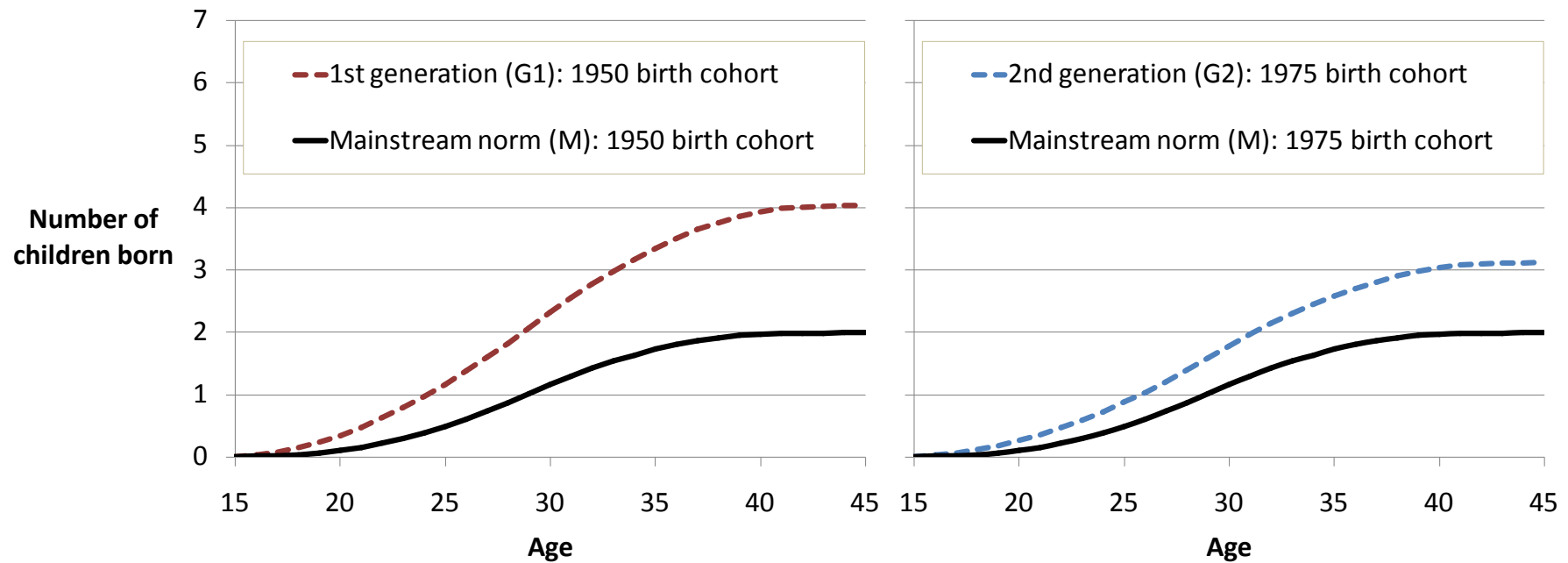
referring to what we have defined as intergenerational assimilation. It is less clear how adaptation over the life course can be applied to the descendants of immigrants because they have all 'arrived' at birth, and therefore have no variation in duration at residence.

One way for research to proceed might be to move beyond an investigation of 'convergence over duration at residence', and instead focus more broadly on 'convergence over exposure to destination norms'. This would mean that adaptation research could use similar analyses to those shown in figures 2.6a-c. The main problem with this would be that it appears to redefine adaptation, or at the very least suggests that instead of investigating adaptation directly, researchers would be investigating the links between fertility and other outcomes of assimilation. This might raise a further set of issues relating to interpretation, especially since some authors argue adaptation may be explained by socio-economic factors, rather than cultural factors (i.e. acculturation) (Andersson & Scott, 2005, 2007; Milewski, 2010a). Any indirect study of fertility adaptation would need to make a strong case that results are not confounded by other explanations, and this is one reason why demographers may prefer to investigate the assimilation of migrant fertility by studying migrant generations.

Intergenerational assimilation

Rather than investigate the assimilation of fertility over a migrant's life course, researchers may choose to study the intergenerational assimilation of fertility. In this case, the aim is to understand the effect of living in a given destination on migrant fertility by exploring whether fertility converges across migrant generations. Coupled with the fact that assimilation is ideally studied using fertility profiles, this suggests a type of convergence that is illustrated by figure 2.8.

Figure 2.8: Understanding intergenerational assimilation through a study of the convergence of fertility profiles over generations



Note: The three stages of convergence are described in the text. This figure shows the first two, the initial difference (left-hand chart), and a narrowing of this difference (right-hand chart).

In this example, the initial difference compares first generation migrants with the mainstream norm from the same birth cohort. The second stage does the same for the second generation, and the third stage (not shown) would compare the third generation. Of course, this might be considered unnecessary if profiles had already converged in the second stage.

As with other convergence types, there are many possible variations to the example in figure 2.8. For example, researchers might choose not to lag migrant generations over time, and instead to compare different generations from the same birth cohort. A cross-sectional comparison like this would allow birth cohort variation, and associated factors like different policy-regimes, to be eliminated as an explanation for convergence. This would imply a type of convergence more like the example shown in figure 2.6a, and it would follow a similar logic of trying to understand the determinants of fertility (in this case, generational status), while holding other determinants constant.

Although this makes sense as a type of convergence, it can be argued that this is not the type of convergence that is predicted by intergenerational assimilation. Indeed, it has been argued elsewhere that convergence due to intergenerational assimilation cannot be assessed without comparing lagged generations (as in figure 2.8) (Parrado & Morgan, 2008; Smith, 2003, 2006). This is because the predictions of intergenerational assimilation relate to the behaviour of consecutive generations, and they approximate a comparison of parents with their children. This comparison is not possible using cross-sectional data without assuming the homogeneity of generational fertility behaviour over time.

Considering other alternatives to figure 2.8, some researchers may choose to disaggregate the first generation and compare adult migrants (generation 1.0) with child migrants (generation 1.5). Although the second generation could be separated according to their number of foreign-born parents (into generation 2.0 and 2.5), this seems less appropriate because they are all the children of first generation immigrants, and hence not consecutive

generations. In any case, it is possible to extend the logic of consecutive comparison to investigate three (or more) generations of migrants, although two consecutive generations or generational subgroups may be sufficient to demonstrate convergence. As always, the scope of the analysis will depend on the availability of data. In addition, a decision will need to be made regarding how to calculate the mainstream norm, and researchers will need to interpret what 'mainstream' means in the context of their research.

Previous research on convergence over generations was discussed in the section on population growth, including the fact that research may have been constrained by a lack of data. A range of different approaches have been used to investigate intergenerational fertility assimilation since Hill's landmark study in 1913 (Dubuc, 2012; Friedlander & Goldscheider, 1978; Goldscheider, 1965; J. A. Hill, 1913; L. E. Hill & Johnson, 2004; Lindstrom & Giorguli Saucedo, 2002; Parrado & Morgan, 2008; Scott & Stanfors, 2011; Stephen & Bean, 1992; Verma, 1979). But there appears to be a total absence of research that explores the intergenerational assimilation of fertility profiles, which suggests that there is plenty of potential for further research.

2.4 Conclusion

In this study, we have argued that there are many plausible definitions of migrant fertility convergence. In the first section, we defined *convergence* as a process of three stages, we then established that there are different ways of measuring *fertility convergence*, and provided three different definitions of *migrant fertility convergence*. In the second section, we created a typology, based on the different motivations for studying migrant fertility convergence, including whether researchers are interested in population growth, the fertility transition, fertility determinants, adaptation, or intergenerational assimilation.

As a result, this study demonstrates that convergence is complex and potentially problematic concept. However, it also goes beyond this to show

how researchers can navigate these problems and complexities. It explains how each type of convergence can be tested empirically, how it relates to previous studies, and what it implies for the design of future research.

Reflecting on the typology that we have created, we do not wish to give the impression that these are the only ways to investigate convergence. For any definition of convergence there are likely to be many valid empirical approaches, and many directions for future research. Nevertheless, we have shown the value of a critical assessment of convergence and highlighted a number of important issues that can be taken forward by the literature. In doing so, we hope that this study lays the foundation for new research.

References

- Abbasi-Shavazi, M. J., & McDonald, P. (2000). Fertility and multiculturalism: Immigrant fertility in Australia, 1977-1991. *International Migration Review*, 34(1), 215-242.
- Abbasi-Shavazi, M. J., & McDonald, P. (2002). A comparison of fertility patterns of European immigrants in Australia with those in the countries of origin. *Genus*, 58(1), 53-76.
- Abu-Lughod, J. (1961). Migrant Adjustment to City Life: The Egyptian Case. *American Journal of Sociology*, 67(1), 22-32.
- Adserà, A., & Ferrer, A. (2014). Factors influencing the fertility choices of child immigrants in Canada. *Population Studies*, 68(1), 65-79. <http://doi.org/10.1080/00324728.2013.802007>
- Adserà, A., Ferrer, A. M., Sigle-Rushton, W., & Wilson, B. (2012). Fertility Patterns of Child Migrants Age at Migration and Ancestry in Comparative Perspective. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 160-189. <http://doi.org/10.1177/0002716212444706>
- Alba, R., & Nee, V. (1997). Rethinking Assimilation Theory for a New Era of Immigration. *International Migration Review*, 31(4), 826-874. <http://doi.org/10.2307/2547416>
- Alba, R., & Nee, V. (2005). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Alders, M. (2000). *Cohort fertility of migrant women in the Netherlands: Developments in fertility of women born in Turkey, Morocco, Suriname, and the Netherlands Antilles and Aruba*. Department of Population Division, Statistics Netherlands, Paper for the BSPS-NVD-URU Conference, Utrecht, 31 August - 1 September, 2000.
- Andersson, G. (2004). Childbearing after Migration: Fertility Patterns of Foreign-born Women in Sweden. *International Migration Review*, 38(2), 747-774.
- Andersson, G., & Scott, K. (2005). Labour-market status and first-time parenthood: The experience of immigrant women in Sweden, 1981-97. *Population Studies*, 59(1), 21-38. <http://doi.org/10.1080/003247205200032683>
- Andersson, G., & Scott, K. (2007). Childbearing dynamics of couples in a universalistic welfare state. *Demographic Research*, 17, 897-938. <http://doi.org/10.4054/DemRes.2007.17.30>
- Bagavos, C., Tsimbos, C., & Verropoulou, G. (2007). Native and Migrant Fertility Patterns in Greece: A Cohort Approach. *European Journal of Population / Revue Européenne de Démographie*, 24(3), 245-263. <http://doi.org/10.1007/s10680-007-9142-6>
- Basten, S. (2013). Comparing Projection Assumptions of Fertility in Six Advanced Asian Economies; or "Thinking Beyond the Medium Variant." *Asian Population Studies*, 9(3), 322-331. <http://doi.org/10.1080/17441730.2013.836394>
- Bean, F. D., & Swicegood, G. (1985). *Mexican American fertility patterns*. University of Texas Press Austin.
- Beck, A., Corak, M., & Tienda, M. (2012). Age at Immigration and the Adult Attainments of Child Migrants to the United States. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 134-159. <http://doi.org/10.1177/0002716212442665>
- Bélanger, A., & Gilbert, S. (2006). The fertility of immigrant women and their Canadian-born daughters. In *Report on the Demographic Situation in Canada, 2002* (pp. 127-151). Statistics Canada.
- Ben-Porath, Y. (1980). *Child mortality and fertility: Issues in the demographic transition of a migrant population*. University Of Chicago Press.

- Billari, F. C., & Wilson, C. (2001). Convergence towards diversity? Cohort dynamics in the transition to adulthood in contemporary Western Europe. *Max Planck Institute for Demographic Research, Working Paper [WP2001-039]*.
- Blau, F. D. (1991). The Fertility of Immigrant Women: Evidence from High Fertility Source Countries. *National Bureau of Economic Research Working Paper Series, No. 3608*. Retrieved from <http://www.nber.org/papers/w3608>
- Bleakley, H., & Chin, A. (2010). Age at arrival, English proficiency, and social assimilation among US immigrants. *American Economic Journal. Applied Economics*, 2(1), 165.
- Bledsoe, C. H., Houle, R., & Sow, P. (2007). High fertility Gambians in low fertility Spain. *Demographic Research*, 16, 375–412. <http://doi.org/10.4054/DemRes.2007.16.12>
- Bongaarts, J., & Casterline, J. (2013). Fertility Transition: Is sub-Saharan Africa Different? *Population and Development Review*, 38(s1), 153–168.
- Bongaarts, J., & Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review*, 24(2), 271–291.
- Carpenter, N. (1927). *Immigrants and Their Children, 1920: A Study Based on Census Statistics Relative to the Foreign Born and the Native White of Foreign Or Mixed Parentage*. U.S. Government Printing Office.
- Chattopadhyay, A., White, M. J., & Debpuur, C. (2006). Migrant Fertility in Ghana: Selection versus Adaptation and Disruption as Causal Mechanisms. *Population Studies*, 60(2), 189–203.
- Claghorn, K. H. (1901). The foreign immigrant in New York City. *Reports of the Industrial Commission*, 15, 465–92.
- Coleman, D. A. (1994). Trends in fertility and intermarriage among immigrant populations in Western Europe as measures of integration. *Journal of Biosocial Science*, 26(1), 107–136.
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64(1), 19–41. <http://doi.org/10.1080/00324720903391201>
- Day, L. H. (1984). Minority-Group Status and Fertility: A More Detailed Test of the Hypothesis. *The Sociological Quarterly*, 25(4), 456–472.
- Demeny, P. McNicoll, Geoffrey. (2003). *Encyclopedia of population*. New York: Macmillan Reference USA.
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>
- Dumont, A. (1894). Démographie des étrangers habitant en France. *Bulletins de La Société D'anthropologie de Paris*, 5(1), 419–433. <http://doi.org/10.3406/bmsap.1894.5528>
- Dumont, A. (1897). Essai sur la natalité au Massachusetts. *Journal de la société française de statistique*, 38, 385–395.
- Dyson, T. (2010). *Population and development: the demographic transition*. London, UK: Zed Books. Retrieved from <http://www.zedbooks.co.uk/>
- Edmonston, B. (2010). The Contribution of Immigration to Population Growth. In T. Salzmann, B. Edmonston, & J. Raymer (Eds.), *Demographic Aspects of Migration* (pp. 29–72). VS Verlag für Sozialwissenschaften. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-531-92563-9_2
- Espenshade, T. J. (1986). Population Dynamics with Immigration and Low Fertility. *Population and Development Review*, 12, 248. <http://doi.org/10.2307/2807908>

- Fernandez, R., & Fogli, A. (2006). Fertility: The role of culture and family experience. *Journal of the European Economic Association*, 4(2-3), 552-561.
- Fischer, N. A., & Marcum, J. P. (1984). Ethnic Integration, Socioeconomic Status, and Fertility Among Mexican Americans. *Social Science Quarterly (University of Texas Press)*, 65(2), 583-593.
- Fokkema, T., de Valk, H., de Beer, J., & Van Duin, C. (2008). The Netherlands: Childbearing within the context of a "Poldermodel" society. *Demographic Research*, 19, 743-794. <http://doi.org/10.4054/DemRes.2008.19.21>
- Ford, K. (1990). Duration of Residence in the United States and the Fertility of US Immigrants. *International Migration Review*, 24(1), 34-68.
- Forste, R., & Tienda, M. (1996). What's Behind Racial and Ethnic Fertility Differentials? *Population and Development Review*, 22, 109-133. <http://doi.org/10.2307/2808008>
- Friedlander, D., & Goldscheider, C. (1978). Immigration, Social Change and Cohort Fertility in Israel. *Population Studies*, 32(2), 299-317. <http://doi.org/10.2307/2173563>
- Garssen, J., & Nicolaas, H. (2008). Fertility of Turkish and Moroccan women in the Netherlands: Adjustment to native level within one generation. *Demographic Research*, 19, 1249-1280. <http://doi.org/10.4054/DemRes.2008.19.33>
- Goldscheider, C. (1965). Nativity, Generation and Jewish Fertility. *Sociological Analysis*, 26(3), 137-147. <http://doi.org/10.2307/3710101>
- Goldscheider, C. (1967). Fertility of the jews. *Demography*, 4(1), 196-209. <http://doi.org/10.2307/2060361>
- Goldscheider, C., & Uhlenberg, P. R. (1969). Minority Group Status and Fertility. *American Journal of Sociology*, 74(4), 361-372.
- Goldstein, S., & Goldscheider, C. (1968). Jewish Americans. Three Generations in a Jewish Community. Retrieved from <http://eric.ed.gov/?id=ED061394>
- Goldstein, S., & Goldstein, A. (1983). Migration and Fertility in Peninsular Malaysia. *A Rand Note, Prepared for The Agency for International Development, [N-1860-AID]*. Retrieved from <http://www.rand.org/pubs/notes/N1860.html>
- Harbison, S. F., & De Jong, G. F. (1980). Migration and fertility: Empirical findings, theoretical relationships and policy implications. Retrieved from http://pdf.usaid.gov/pdf_docs/PNAAX010.pdf
- Harbison, S. F., & Weishaar, M. (1981). Samoan Migrant Fertility: Adaptation and Selection. *Human Organization*, 40(3), 268-273.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.
- Hervitz, H. M. (1985). Selectivity, adaptation, or disruption? A comparison of alternative hypotheses on the effects of migration on fertility: The case of Brazil. *International Migration Review*, 19(2), 293-317.
- Hill, J. A. (1913). Comparative Fecundity of Women of Native and Foreign Parentage in the United States. *Publications of the American Statistical Association*, 13(104), 583-604. <http://doi.org/10.2307/2965013>
- Hill, L. E., & Johnson, H. P. (2004). Fertility Changes Among Immigrants: Generations, Neighborhoods, and Personal Characteristics. *Social Science Quarterly*, 85(3), 811-827. <http://doi.org/10.1111/j.0038-4941.2004.00246.x>
- Hoem, J. M. (2014). The dangers of conditioning on the time of occurrence of one demographic process in the analysis of another. *Population Studies*, 68(2), 151-159. <http://doi.org/10.1080/00324728.2013.843019>

- Hutchinson, B. (1961). Fertility, Social Mobility and Urban Migration in Brazil. *Population Studies*, 14(3), 182-189. <http://doi.org/10.2307/2173327>
- Iliffe, L. (1978). Estimated fertility rates of Asian and West Indian immigrant women in Britain, 1969-74. *Journal of Biosocial Science*, 10(2), 189-197.
- Jaffe, A. J., & Cullen, R. M. (1975). Fertility of the Puerto Rican Origin Population-Mainland United States and Puerto Rico: 1970. *International Migration Review*, 9(2), 193. <http://doi.org/10.2307/3002749>
- Jonsson, S. H., & Rendall, M. S. (2004). The Fertility Contribution of Mexican Immigration to the United States. *Demography*, 41(1), 129-150.
- Kahn, J. R. (1988). Immigrant Selectivity and Fertility Adaptation in the United States. *Social Forces*, 67, 108.
- Kahn, J. R. (1994). Immigrant and native fertility during the 1980s: adaptation and expectations for the future. *International Migration Review*, 28(3), 501-519.
- Kuczynski, R. R. (1901). The Fecundity of the Native and Foreign born Population in Massachusetts (I.). *The Quarterly Journal of Economics*, 16(1), 1-36. <http://doi.org/10.2307/1882901>
- Kuczynski, R. R. (1902). The Fecundity of the Native and Foreign born Population in Massachusetts (II.). *The Quarterly Journal of Economics*, 16(2), 141.
- Kulu, H. (2005). Migration and Fertility: Competing Hypotheses Re-examined. *European Journal of Population / Revue Européenne de Démographie*, 21(1), 51-87. <http://doi.org/10.1007/s10680-005-3581-8>
- Kulu, H. (2006). Fertility of internal migrants: comparison between Austria and Poland. *Population, Space and Place*, 12(3), 147-170. <http://doi.org/10.1002/psp.406>
- Lindstrom, D. P., & Giorguli Saucedo, S. (2002). The Short- and Long-Term Effects of U.S. Migration Experience on Mexican Women's Fertility. *Social Forces*, 80(4), 1341-1368. <http://doi.org/10.1353/sof.2002.0030>
- Lorimer, F. (1956). Culture and Human Fertility. *Journal of School Health*, 26(4), 136-136. <http://doi.org/10.1111/j.1746-1561.1956.tb00823.x>
- Lutz, W., & Scherbov, S. (2002). Can immigration compensate for Europe's low fertility. *European Demographic Research Papers Working Paper*. Vienna: Vienna Institute of Demography. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.15.5199&rep=rep1&type=pdf>
- Macmillan Dictionary. (2014). convergence - definition of convergence by Macmillan Dictionary. Retrieved July 28, 2014, from <http://www.macmillandictionary.com/dictionary/british/convergence>
- Massey, D. S. (1981). Dimensions of the New Immigration to the United States and the Prospects for Assimilation. *Annual Review of Sociology*, 7, 57-85. <http://doi.org/10.1146/annurev.so.07.080181.000421>
- Mayer, J., & Riphahn, R. T. (2000). Fertility assimilation of immigrants: Evidence from count data models. *Journal of Population Economics*, 13(2), 241-261.
- Milewski, N. (2007). First child of immigrant workers and their descendants in West Germany: Interrelation of events, disruption, or adaptation? *Demographic Research*, 17, 859-896. <http://doi.org/10.4054/DemRes.2007.17.29>
- Milewski, N. (2010a). *Fertility of immigrants: a two-generational approach in Germany*. Springer Berlin Heidelberg. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-642-03705-4_1

- Milewski, N. (2010b). Immigrant fertility in West Germany: Is there a socialization effect in transitions to second and third births? *European Journal of Population / Revue Européenne de Démographie*, 26, 297–323. <http://doi.org/10.1007/s10680-010-9211-0>
- Milewski, N. (2011). Transition to a first birth among Turkish second-generation migrants in Western Europe. *Advances in Life Course Research*, 16(4), 178–189. <http://doi.org/10.1016/j.alcr.2011.09.002>
- Morgan, S. P., & Taylor, M. G. (2006). Low Fertility at the Turn of the Twenty-First Century. *Annual Review of Sociology*, 32(1), 375–399. <http://doi.org/10.1146/annurev.soc.31.041304.122220>
- Murphy, M. (1995). The impact of migration on population composition: The British case. In S. Voets, J. J. Schoorl, & B. de Bruijn (Eds.), *The demographic consequences of international migration* (pp. 207–224). The Hague: Netherlands Interdisciplinary Demographic Institute.
- Myers, G. C., & Macisco, J. J. (1975). Revised Bibliography on Migration and Fertility. *International Migration Review*, 9(2), 221–231.
- Nedoluzhko, L., & Andersson, G. (2007). Migration and first-time parenthood: Evidence from Kyrgyzstan. *Demographic Research*, 17, 741–774.
- Ng, E., & Nault, F. (1997). Fertility among Recent Immigrant Women to Canada, 1991: An Examination of the Disruption Hypothesis. *International Migration*, 35(4), 559–580. <http://doi.org/10.1111/1468-2435.00027>
- OED. (2014). convergence, n. *OED Online*. Oxford University Press. Retrieved from <http://www.oed.com/view/Entry/40732>
- Parrado, E. A. (2011). How High is Hispanic/Mexican Fertility in the United States? Immigration and Tempo Considerations. *Demography*, 48(3), 1059–1080. <http://doi.org/10.1007/s13524-011-0045-0>
- Parrado, E. A., & Morgan, S. P. (2008). Intergenerational Fertility Among Hispanic Women: New Evidence of Immigrant Assimilation. *Demography*, 45(3), 651–671.
- Portes, A. (1996). *The New Second Generation*. Russell Sage Foundation.
- Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The Annals of the American Academy of Political and Social Science*, 530(1), 74–96.
- Pressat, R. (1985). *The Dictionary of Demography*. (C. Wilson, Ed.). Oxford: Basil Blackwell.
- Ram, B., & George, M. V. (1990). Immigrant Fertility Patterns in Canada, 1961–1986. *International Migration*, 28(4), 413–426. <http://doi.org/10.1111/j.1468-2435.1990.tb00489.x>
- Roig Vila, M., & Castro-Martín, T. (2008). Childbearing Patterns of Foreign Women in a New Immigration Country. *Population (English Edition)*, Vol. 62(3), 351–379. <http://doi.org/10.3917/pope.703.0351>
- Rosenwaike, I. (1973). Two generations of Italians in America: their fertility experience. *International Migration Review*, 7(3), 271–280.
- Rudmin, F. W. (2003). Critical history of the acculturation psychology of assimilation, separation, integration, and marginalization. *Review of General Psychology*, 7(1), 3–37. <http://doi.org/10.1037/1089-2680.7.1.3>
- Rumbaut, R. G., & Weeks, J. R. (1986). Fertility and Adaptation: Indochinese Refugees in the United States. *International Migration Review*, 20(2), 428–466. <http://doi.org/10.2307/2546043>

- Scott, K., & Stanfors, M. (2011). The transition to parenthood among the second generation: Evidence from Sweden, 1990–2005. *Advances in Life Course Research*, 16(4), 190–204. <http://doi.org/10.1016/j.alcr.2011.09.003>
- Singley, S. G., & Landale, N. S. (1998). Incorporating Origin and Process in Migration-Fertility Frameworks: The Case of Puerto Rican Women. *Social Forces*, 76(4), 1437–1464. <http://doi.org/10.2307/3005841>
- Smith, J. P. (2003). Assimilation across the Latino Generations. *The American Economic Review*, 93(2), 315–319.
- Smith, J. P. (2006). Immigrants and the Labor Market. *Journal of Labor Economics*, 24(2), 203–233. <http://doi.org/10.1086/jole.2006.24.issue-2>
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225–248. <http://doi.org/10.4054/DemRes.2008.19.9>
- Sorenson, A. M. (1985). Fertility Expectations and Ethnic Identity among Mexican-American Adolescents: An Expression of Cultural Ideals. *Sociological Perspectives*, 28(3), 339–360.
- Sorenson, A. M. (1988). The Fertility and Language Characteristics of Mexican-American and Non-Hispanic Husbands and Wives. *The Sociological Quarterly*, 29(1), 111–130. <http://doi.org/10.2307/4121576>
- Spengler, J. J. (1931a). The Comparative Fertility of the Native and the Foreign-Born Women in New York, Indiana, and Michigan. *The Quarterly Journal of Economics*, 45(3), 460–483. <http://doi.org/10.2307/1883899>
- Spengler, J. J. (1931b). The Decline in Birth-Rate of the Foreign Born. *The Scientific Monthly*, 32(1), 54–59.
- Stephen, E. H., & Bean, F. D. (1992). Assimilation, Disruption and the Fertility of Mexican-Origin Women in the United States. *International Migration Review*, 26(1), 67–88. <http://doi.org/10.2307/2546937>
- Swicegood, G., Bean, F. D., Stephen, E. H., & Opitz, W. (1988). Language usage and Fertility in the Mexican-Origin Population of the United States. *Demography*, 25(1), 17–33. <http://doi.org/10.2307/2061475>
- Toulemon, L. (2004). Fertility among immigrant women: new data, a new approach. *Population & Societies*, 400. Retrieved from http://www.ined.fr/en/publications/pop_soc/bdd/publication/540/
- Toulemon, L. (2006). *Fertility Among Immigrant Women in France: New Data, a New Approach*. Prepared for Population Association of American 2006 Annual Meeting, Los Angeles, California, March 30–April 1, 2006.
- Toulemon, L., & Mazuy, M. (2004). *Comment prendre en compte l'âge à l'arrivée et la durée de séjour en France dans la mesure de la fécondité des immigrants?* INED. Retrieved from http://www.ined.fr/fichier/t_publication/1053/publi_pdf1_120.pdf
- Tromans, N., Natamba, E., & Jefferies, J. (2007). Have women born outside the UK driven the rise in UK births since 2001? *Population Trends*, 136, 28–42.
- Verma, R. B. P. (1979). Variations in Family Size among Canadian Women by Generation and Ethnic Group. *International Journal of Comparative Sociology (Brill Academic Publishers)*, 20(3/4), 293–303.
- Waldorf, B. (1999). Impacts of Immigrant Fertility on Population Size and Composition. *Migration and Restructuring in the United States: A Geographic Perspective*, 193–211.
- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31(1), 105–125. <http://doi.org/10.1146/annurev.soc.29.010202.100026>

- Westoff, C. F., & Frejka, T. (2007). Religiousness and Fertility among European Muslims. *Population and Development Review*, 33(4), 785–809. <http://doi.org/10.1111/j.1728-4457.2007.00197.x>
- Wilson, C. (2001). On the Scale of Global Demographic Convergence 1950–2000. *Population and Development Review*, 27(1), 155–171. <http://doi.org/10.1111/j.1728-4457.2001.00155.x>
- Woldemicael, G., & Beaujot, R. (2012). Fertility Behavior of Immigrants in Canada: Converging Trends. *Journal of International Migration and Integration*, 13(3), 325–341. <http://doi.org/10.1007/s12134-011-0199-z>
- Yinger, J. M. (1981). Toward a theory of assimilation and dissimulation. *Ethnic and Racial Studies*, 4(3), 249–264. <http://doi.org/10.1080/01419870.1981.9993338>
- Young, C. M. (1991). Changes in the Demographic Behaviour of Migrants in Australia and the Transition between Generations. *Population Studies*, 45(1), 67–89.
- Zarate, A., & Zarate, A. U. de. (1975). On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. *International Migration Review*, 9(2), 115–156.
- Zhou, M. (1997). Segmented Assimilation: Issues, Controversies, and Recent Research on the New Second Generation. *International Migration Review*, 31(4), 975–1008. <http://doi.org/10.2307/2547421>

Appendix

TABLE A2.1: A CONCEPTUAL TYPOLOGY FOR MIGRANT FERTILITY CONVERGENCE

Motivation	Implied convergence concept	Implied focus on fertility	Implied migrant group(s)	Implied comparison
(1) Understanding population growth				
(a) for one migrant group	over time	completed fertility	a single generation	migrants versus the national (or sub-national) average
(b) across generations	over generations	completed fertility	two or more migrant generations	migrants versus the national (or sub-national) average
(2) Theorising and explaining fertility				
(a) the fertility transition	over generations	fertility profiles	two or more migrant generations	migrants (and non-migrants at origin) versus a post-transitional norm
(b) fertility determinants	over exposure to destination	any	a migrant group that varies by exposure to destination	migrant versus a native group that is comparable to the migrants
(3) Theorising and explaining migration				
(a) adaptation	over exposure to destination	fertility profiles	a migrant group that varies by exposure to destination	migrants versus the 'mainstream' norm
(b) intergenerational assimilation	over generations	fertility profiles	two or more migrant generations	migrants versus the 'mainstream' norm

3. Understanding how immigrant fertility differentials vary over the reproductive life course

Abstract

Studies of migrant fertility differentials in high income countries often indicate that foreign-born women have more children than native-born women, at least for some immigrant groups. Yet little is known about how these differentials vary over the life course of individual immigrants, in particular for those who have reached the end of their reproductive years. Knowledge of life course differentials is important because it shows how immigrant and native fertility behaviour interrelate at different stages of childbearing. At the same time, it identifies the immigrant groups whose differentials may be hidden by a partial analysis of the life course, and highlights plausible explanations for the childbearing of different immigrant groups. This research analyses the life course differentials for a cohort of women in the UK who are aged 40 and above. Compared with UK-born natives, women have significantly higher completed fertility if they are born in India, Pakistan, Bangladesh, Jamaica, or Western and Central Africa. However, the profile of differentials varies considerably over the life course for these different immigrant groups, especially by age at migration. For example, women from Bangladesh and the Caribbean have significantly more children than natives at age 20, but the same is not true for other origin groups, and for high income origins there is a consistent pattern of low fertility at early ages. Overall, the results imply that when analysing immigrant fertility, researchers should be aware of life course variation, in addition to variation by immigrant group. The analysis also informs future research by indicating the immigrant groups and stages of the life course that are most likely to be of interest, depending upon the aims of future research.

3.1 Introduction

One of the most common aims of research on migrant fertility is to understand differences between foreign-born and native-born fertility. These differences are often referred to as immigrant fertility differentials, and research suggests that they exist in almost all high income countries, especially those in Europe, North America and Oceania (e.g. Abbasi-Shavazi & McDonald, 2000; Adserà & Ferrer, 2014b; Bélanger & Gilbert, 2006; Haug, Compton, & Courbage, 2002; Parrado & Flippen, 2012; Sevak & Schmidt, 2008; Sobotka, 2008; Statistics New Zealand, 2012). Immigrant fertility differentials are of interest to demographers for a variety of reasons, not least because they help to explain the contribution of immigrants to population change in a destination country. This contribution is typically of interest in high income countries due to concerns about population ageing, which relate to pensions, old-age support ratios, and the proportion of the population that is of working age (Grant et al., 2004; Harper & Hamblin, 2014). Not only do immigrants contribute to a destination's population size via their number of children, but they also have an impact on population composition, especially the future age distribution of a population, via the timing of their births.

In addition to these interests, researchers often analyse immigrant fertility differentials with a focus on fertility or migration. This includes studies of the determinants of fertility, where immigrants are often compared to natives in an effort to understand how exposure to cultural norms influences childbearing behaviour (e.g. Bean & Swicegood, 1985; Haug et al., 2002; Hill & Johnson, 2004). Similarly, research often compares immigrant and native fertility to test a variety of hypotheses about migration and migrant fertility (Milewski, 2010). This includes hypotheses like *disruption* or *family formation* that make predictions about the links between fertility and the timing of migration (e.g. Milewski, 2007; Stephen & Bean, 1992). It also includes hypotheses like *adaptation* and *intergenerational assimilation* that make predictions about migrant

fertility convergence, where convergence describes the way that differentials are expected to change over time (e.g. Kahn, 1988; Parrado & Morgan, 2008).

Despite the importance of immigrant fertility differentials for each of these research interests, there is a lack of research that shows how these differentials vary over the life course (Kulu & González-Ferrer, 2014). In addition to providing an overview of differentials by age, life course variation in differentials is important because it demonstrates the relationship between differentials at different stages of childbearing. For example, the analysis of differentials over the whole life course can show whether they exist at early-ages, whether they diminish with age, and how they relate to differentials at the end of childbearing. This shows the age at which immigrants are most likely to have an impact on population change via their fertility. It also highlights the most likely explanations for the fertility behaviour of different immigrant groups, and indicates those groups who are worthy of further investigation.

Previous research has yet to apply a life course approach to the study of immigrant fertility differentials, and this is particularly evident from the way that migrant fertility has been measured and analysed. Most research has analysed differentials using summary measures of fertility like the period Total Fertility Rate (TFR) (e.g. Coleman, 1994; Haug et al., 2002; Ng & Nault, 1997; Toulemon, 2004; Toulemon & Mazuy, 2004), or measures that focus on fertility at a particular stage of the life course, like first birth timing (e.g. Andersson & Scott, 2005; Batson, 2013; Lübke, 2015; Milewski, 2007, 2011; Mussino & Van Raalte, 2012) or completed fertility (e.g. Mayer & Riphahn, 2000; Parrado, 2011; Parrado & Morgan, 2008; Rosenwaike, 1973; Young, 1991). Most studies are also limited in their investigation of the whole reproductive life course (i.e. completed fertility profiles) because they study samples that include women who may not have completed childbearing (e.g. samples of women aged 15-45). Even when higher order parities are analysed (i.e. second and later births), the analysis of such samples may give a distorted impression of the variation in

differentials by age. This is because future births to immigrants and natives (not yet observed) may occur at comparatively different rates.

As a result of the ways in which migrant fertility has been analysed, demographers have limited knowledge about life course variation in immigrant fertility differentials. This research therefore sets out to investigate two related questions: (i) how do immigrant fertility differentials vary over the reproductive life course, and (ii) how similar is this variation over the life course for different groups of immigrants? The latter is particularly important given that migrant fertility differentials have been found to vary considerably by type of migrant, in particular by age at migration and country of birth (e.g. Andersson, 2004; Coleman, 1994; Haug et al., 2002; Toulemon & Mazuy, 2004).

The next section (3.2) provides more background about the contribution of this study, including a more detailed discussion of the importance of studying differentials over the life course. Then, alongside a detailed discussion of the data, section 3.3 explains the context for the empirical analysis, which focuses on the UK. As well as providing a general demonstration of the benefits of analysing differentials over the life course, this research aims to generate new knowledge about migrant fertility in the UK. Section 3.4 describes the method that is used to achieve these aims. Essentially, this involves examining the entire childbearing profile of immigrants and natives who have completed their fertility, and repeating this analysis by country of birth and age at migration. In doing so, some of the analysis of fertility and fertility differentials refers to periods when (future) immigrants have not yet migrated. The analysis provides new findings about the links between immigrant origins, the timing of migration, and patterns of fertility differentials before and after migration. These results are presented and discussed in section 3.5, alongside their implications, before conclusions are presented in the final section (3.6).

3.2 Background

3.2.1 Why is the life course important for migrant fertility?

Among other things, the life course approach is founded on the idea that life is a process, or a sequence of interdependent events, such that experiences or behaviours at any age may have an impact on behaviour later in life (Elder, 1985, 1975; Elder & Rockwell, 1979). As has been highlighted by recent research, this perspective is extremely relevant for the study of migration because the process of migration has the potential to impact many different aspects of an individual's life, not just in the short-term but well into the future (Castro-Martín & Cortina, 2015; Kulu & González-Ferrer, 2014). When studying fertility, the relationships between one part of the life course and another are also of crucial importance because fertility is a long-run process, where the occurrence of one childbearing 'event' (pregnancy or birth), is likely to have a strong impact on the chances of further events occurring, in both the short- and long-term.

A better understanding of fertility or migration can therefore be obtained by taking a life course perspective. This is especially the case when studying immigrant fertility, which not only concerns both processes, but also their interaction. Compared with natives, immigrants are expected to exhibit different behaviours over the life course across a range of social processes, either based on theory (e.g. Alba & Nee, 2005), or the findings of empirical research (Massey, 1981; Waters & Jiménez, 2005). By comparing immigrant fertility differentials over the life course, researchers can acknowledge and investigate this expectation, with a particular focus on the reproduction of immigrants relative to natives. As outlined in the introduction, there are different reasons why it is beneficial to study how immigrant fertility differentials vary over the life course, including: to gain insights about population dynamics, to explain migrant fertility behaviour, and to develop new knowledge about the measurement of migrant fertility. These motivations

will often overlap, but they are described separately in the three sections that follow.

3.2.2 Measuring migrant fertility

A study of immigrant fertility differentials over the life course allows researchers to make more than one comparison. In addition to comparing immigrants and natives (using differentials), it also makes it possible to compare their childbearing at different ages (using the pattern of differentials by age). The comparison of numbers of children born by age can be seen as a comparison of the quantum of fertility. Although demographers often measure fertility quantum using completed fertility, the term 'quantum' is more generally defined as the frequency that an event occurs (e.g. number of births), and hence can be measured at any age (Bongaarts & Feeney, 1998; Pressat, 1985; Ryder, 1980). If quantum differentials are estimated at different ages, and the results at different ages are compared, then patterns of differentials can be attributed to differences in the tempo (i.e. timing) of immigrant births, as compared with natives. In this way, the relative variation in quantum and tempo can be contrasted, thereby highlighting the interrelationships between immigrant and native childbearing over the life course. For example, large quantum differentials at early ages will suggest that immigrants are more likely to have early births than natives. But by comparing these with differentials at older ages, researchers can also tell the extent to which early immigrant childbearing is associated with the existence of differentials at the end of the reproductive life course.

Studies of the variation in differentials by age can also be used to provide insights about fertility measurement. For example, if differentials are constant over the life course, then this suggests that comparisons between immigrants and natives will be insensitive to the part of the profile that is analysed, often irrespective of the measure of fertility that is chosen. On the

other hand, if there is significant variation in differential profiles then research will depend upon the choice of measure.

Evidence of life course variation in differentials can also help to interpret different fertility measures like the period TFR or completed fertility. Recent research suggests the TFR may exaggerate the size of immigrant fertility differentials (Parrado, 2011; Sobotka & Lutz, 2011; Toulemon, 2004, 2006; Toulemon & Mazuy, 2004). For example, research on the US has shown that the period TFR gives an inaccurate estimate of differences in completed fertility between Hispanic or Mexican women and US natives (Parrado, 2011). In research on immigrants in France, much of the difference between these measures is due to the fact that the fertility of immigrants is much lower than the fertility of French-born women before migration, and much higher afterwards (Toulemon, 2004, 2006; Toulemon & Mazuy, 2004). The analysis of life course differentials by age at migration can therefore help to identify the migrant groups who exhibit such behaviour, including the groups whose period TFR is most likely to be different from their completed fertility. On the other hand, some immigrants may have constant differentials over the life course, irrespective of their age at migration. This would suggest that the use of period TFRs for evaluating completed fertility could be more appropriate for these groups.

By considering the entirety of childbearing, the analysis of life course differentials can inform a range of fertility measurement choices. In showing the ages at which differentials exist, they indicate whether differentials are likely to be seen when analyses are narrowed to focus on part of the fertility profile. For example, if differentials only exist at early ages, then an analysis of first birth risks may be more appropriate than an analysis of completed fertility. In this sense, information about life course differentials is likely to be useful in a variety of contexts, especially when data are scarce and it is impossible to analyse the entire reproductive life course.

3.2.3 Understanding population dynamics

The fertility of immigrants can impact a destination's population in a variety of ways, in particular when this differs from the average fertility of their destination. Immigrants make an obvious contribution to population size via their number of children born (quantum). But their fertility also has an impact on population composition, in particular the future age distribution of a population, not only via number of children born, but also via the timing of births (tempo). The analysis of life course differentials can therefore show how both the quantum and tempo of immigrant fertility has an influence on population dynamics. When analysed alongside the characteristics of immigrants, it can also highlight the groups that have the largest influence.

As an alternative to the analysis of life course differentials, researchers might choose to focus on completed fertility differentials, and use these to identify the immigrant groups that eventually make the largest contribution to population size. However, immigrants with similar completed fertility may have very different fertility profiles at earlier ages, and may therefore make different contributions to population change. Immigrants who exhibit larger differentials at early ages will make an earlier contribution to population size, and may also have shorter intervals between consecutive generations. Immigrants who have larger differentials at early ages are also more likely to contribute to population growth shortly after arrival, including if they give birth before arrival and migrate with their children.

When combined with information on immigrant characteristics, for example country of birth, life course differentials provide information on the comparative childbearing of different immigrant groups. This information is useful for understanding population dynamics because it helps to predict the impact of changes to the composition of the migrant population, for example due to changing patterns of immigration (that may themselves be affected by immigration policy). Similarly, the comparisons of life course differentials by origin group can highlight the groups who have the greatest impact on certain

policy-areas. This includes the impact of immigrant fertility on population ageing via the size of the future working age population (Grant et al., 2004; Harper & Hamblin, 2014). It also includes policies that relate to birth timing. For example, the earlier timing of immigrant births may increase the demand for school places in the areas where immigrants live. The timing of immigrant childbearing, as compared with natives, may be also a marker of inequality or indicative of social disadvantage (McLanahan, 2004), although this is likely to depend upon the role of birth timing for different immigrant groups (Geronimus & Thompson, 2004; Goisis & Sigle-Rushton, 2014).

3.2.4 Explaining migrant fertility behaviour

Studies of the variation in life course differentials can also help researchers to explain immigrant fertility behaviour. These explanations can be based on the comparison of differentials over the life course (i.e. within profiles), or the comparison of patterns of differentials across groups (i.e. between profiles). For example, by comparing within profiles it is possible to establish whether large differentials at early ages are sustained over the life course, and therefore whether completed fertility differentials can be explained by early childbearing. By comparing between profiles, researchers may instead gain insights about the broader determinants of fertility, for example by examining how life course differentials vary by exposure to destination in order to explore the social and cultural determinants of fertility.

Researchers have developed numerous hypotheses to explain the fertility behaviour of immigrants and why this differs from the fertility of the destination population. These include, but are not limited to: adaptation, intergenerational assimilation, childhood socialisation, cultural entrenchment, disruption, and family formation (Coleman, 1994; Goldscheider & Uhlenberg, 1969; Goldstein & Goldstein, 1981; Hervitz, 1985; Kulu, 2005; Milewski, 2010; Parrado & Morgan, 2008; Ritchey, 1975; Zarate & Zarate, 1975). These hypotheses are too numerous to investigate in any one piece of research, and

are not necessarily straightforward to test, even in isolation. Nevertheless, a comparison of life course differentials can help to narrow the potential list of explanations for the fertility of a given migrant group. For some explanations, it can also show which groups, and which stages of the life course, merit further investigation.

This last point is particularly true for research that investigates migrant fertility convergence, which can be usefully informed by a prior analysis of life course differentials. The type of migrant fertility convergence that researchers choose to investigate will depend upon the subject of their research. For example, although adaptation and intergenerational assimilation each make a prediction that migrant fertility will converge toward the destination fertility norm, they each imply a different comparison, either over the life course (adaptation) or across generations (intergenerational assimilation) (Alba & Nee, 2005; Kahn, 1994; Milewski, 2010; Parrado & Morgan, 2008). However, despite these important differences between types of migrant fertility convergence, the concept can be defined broadly as a process of three stages: (1) the existence of a difference in fertility, (2) the narrowing of this difference, and (3) the disappearance of this difference. At a minimum, immigrant fertility differentials can provide evidence in support of the first of these stages, and therefore identify the immigrant groups who warrant further investigation (of stages two and three). Moreover, by showing the ages at which differentials occur, the analysis of life course differentials can help to guide the choices of researchers (e.g. fertility measures, migrants groups) when analysing convergence for only one aspect of fertility (e.g. first birth timing).

Although it may not be possible to carry out a robust test of specific hypotheses without bespoke research designs, the analysis of life course differentials can provide an indication that some hypotheses are more plausible than others. This is particularly the case when the analysis disaggregates migrants by origin and age at migration. For example, cultural entrenchment predicts that certain immigrant groups will have different fertility from natives

due to their lack of exposure to destination culture and native fertility norms. Given this prediction, it is more difficult to argue for cultural entrenchment in the absence of differentials, especially if the focus is on ancestral origins that have different fertility norms from the destination.

In contrast to cultural entrenchment, childhood socialisation predicts that migrant fertility depends upon the fertility preferences that migrants are exposed to in childhood (Hervitz, 1985). This implies that the fertility of adult migrants (i.e. those who migrate after the end of childhood), will be similar to the fertility of their origin country (due to the country context of socialisation). As such, an absence of fertility differentials is usually expected for immigrants from countries with a similar fertility as their destination, or for child migrants who arrive in a destination before the end of childhood, and before childbearing has begun. An absence of differentials for child migrants therefore provides indicative evidence in support of childhood socialisation.

The reason that this evidence is only indicative is because of the likelihood that there are alternative explanations for a lack of child migrant differentials. There are several hypotheses that predict a link between the timing of migration and the timing of fertility for adult migrants. These include that fertility is disrupted by migration (disruption) and that fertility is elevated after migration because migration is linked to partnership behaviour (family formation) (Goldstein & Goldstein, 1983; Milewski, 2010). Although these hypotheses are hard to assess without reference to the population at origin, they do not apply to child migrants. As such, in addition to childhood socialisation, a lack of differentials for child migrants might be explained by the fact that, unlike adult migrants, the timing of their migration and fertility are not interlinked.

The importance of migration timing for adult migrants suggests that the analysis of differentials by age at migration can help inform explanations for immigrant fertility, especially if it allows child and adult migrants to be distinguished. Age at migration is also linked to 'exposure to destination',

which can be measured by duration of residence (age minus age at migration). Convergence over exposure to destination can therefore be evaluated by comparing how life course differentials vary by age at migration. Similar to research on ethnic fertility differentials, this analysis can be used to investigate exposure to destination as a determinant of fertility.

Again, caution is required when analysing differentials by exposure. Adaptation predicts migrant fertility convergence over the life course (after arrival) due to exposure to destination norms (Harbison & Weishaar, 1981; Milewski, 2010). This suggests that adaptation might be supported by profiles that show large fertility differentials immediately after migration (i.e. elevated fertility), as long as these profiles then gradually disappear with age. However, adaptation is hard to assess for adult migrants because elevated fertility after migration might have a range of alternative explanations.

These include the possibility that certain types of immigrants are selected from the origin population (selection) or that women's propensity to migrate is increased if they do not have a child (reverse causality) (Harbison & Weishaar, 1981; Toulemon, 2006). As a third alternative, immigrants may delay childbearing until after migration, as a form of disruption of childbearing in anticipation of their migration (Milewski, 2010). Despite the difficulties of isolating any single explanation, it is possible to provide some indirect evidence about adaptation by exploring the differentials for child migrants. Slightly different from childhood socialisation, one expectation of adaptation is that child migrants (as a group) have differentials that become smaller as they approach the end of their childbearing. This is because they will have a longer time to adapt to the destination norm for completed fertility than the norm for early childbearing.

3.2.5 The benefits of a study of life course differentials

Given the potential benefits of a study of immigrant fertility differentials over the life course, it is perhaps surprising that such a study has not previously

been attempted. There are some studies that have analysed the completed and partially completed fertility profiles of immigrants (e.g. Alders, 2000; Bagavos, Tsimbos, & Verropoulou, 2007; Fokkema, de Valk, de Beer, & Van Duin, 2008; Friedlander & Goldscheider, 1978; Garssen & Nicolaas, 2008). However, there do not appear to have been any studies that have attempted to calculate and analyse immigrant fertility differentials over the entire reproductive life course. As discussed in the introduction, most of what we know about immigrant fertility differentials is either based on period measures of fertility like the TFR, or on the examination of part of the childbearing life course, for example the analysis of first birth rates. This study therefore aims to describe how immigrant fertility differentials vary over the life course, and how this life course variation is different for different groups of immigrants. To do this, it carries out an empirical study of the UK.

3.3 Context and data

3.3.1 The UK case

The UK is comprised of four constituent countries, which are: England, Wales, Scotland, and Northern Ireland. There are several reasons why the UK is an excellent case for the study of immigrant fertility, especially in Europe. Compared to most other high income countries, the UK has a long history of immigration from a diverse range of origins (Coleman, Compton, & Salt, 2002; Rendall & Salt, 2005; Walvin, 1984). The existence of sizeable groups of older migrants (ONS, 2012b; Rendall & Ball, 2004; Rendall & Salt, 2005), means that it has a large population of immigrant women who have completed their fertility. Importantly, the UK also has a data source that allows their fertility history to be studied, as described below. As well as allowing the estimation of completed fertility profiles, these data allow a range of comparisons for different migrant groups because they collect data on country of birth and age at migration. Given that the UK has a diverse immigrant population, this means that profiles

can be calculated separately for different migrant groups, in many cases allowing separate origin countries to be identified.

The UK is of considerable interest to contemporary demographers as one of several European countries that has experienced recent increases in the size of its foreign-born population (Coleman, 2009; Haug et al., 2002). Accompanying this trend, there has been a strong interest in the fertility behaviour of migrants, including as part of a broader debate about the impact and integration of new waves of immigrants (Allen & Warrell, 2013; BBC, 2008, 2013; Easton, 2012; Sedghi, 2014). As with many other European countries, there is some evidence of immigrant fertility differentials in the UK (Coleman, 1994; Dormon, 2014; Dubuc, 2012; Iliffe, 1978; Murphy, 1995; Robards & Berrington, 2015; Sigle-Rushton, 2008; Sobotka, 2008; Tromans, Natamba, & Jefferies, 2007; Waller, Berrington, & Raymer, 2014; Zumpe, Dormon, & Jefferies, 2012). However, as argued above, there is limited knowledge about these differentials because they have not been analysed over the life course. In fact, almost everything that is known about immigrant fertility in the UK is based on the analysis of summary measures of period fertility like the Total Fertility Rate.

The history of migration to the UK from different origins is considerable (e.g. Coleman et al., 2002; Daley, 1998; Foner, 2009; Hornsby-Smith & Dale, 1988; Horsfield, 2005; Murphy, 1995; Peach, 2006; Rendall & Ball, 2004; Rendall & Salt, 2005; Walvin, 1984). Historically, the largest group of immigrants to the UK have come from Ireland, but since 2001 they have been replaced by Indians as the largest foreign-born group (ONS, 2012b). Indian migration began in earnest in the late 1960s and early 1970s, and this was closely followed by significant inflows of migrants from Pakistan around the mid-1970s, and then migration from Bangladesh which gathered pace at the end of the 1970s and the beginning of the 1980s (Coleman et al., 2002). In contrast to these South Asian origins, immigration from the Caribbean was at its peak in the 1950s and 1960s, and then fell considerably after the Commonwealth Immigrants Act introduced restrictions in 1962 (Foner, 2009). Nevertheless,

much family reunification occurred after the Act, which led to continued immigration of Caribbean women throughout the 1960s. Of the other origins and origin groups that are analysed here, immigrants from the 'Old Commonwealth' countries (New Zealand, Australia & Canada) have a considerable history of settlement in the UK. This can be contrasted with Eastern European and African immigrants who have only migrated in significant numbers more recently, albeit from a diverse range of origin countries (Daley, 1998; ONS, 2013b).

3.3.2 Data

This research uses data from the first wave of Understanding Society (UKHLS), which are representative of the UK population, and includes responses for almost 60,000 adults who were surveyed between 2009 and 2011 (University of Essex, 2011). Approximately 10% of this sample is part of an ethnic minority boost, which means that first generation migrants are overrepresented. Appendix table A3.1 provides precise details of how the main analytical sample is derived. The main eligible sample includes only those women, aged between 40 and 70 (i.e. born between 1941 and 1971), who were not surveyed by proxy, and who migrated before they were aged 36. The latter restriction was included so that all women were resident in the UK for at least 5 years before their final fertility measurement at age 40.

For the purposes of this research, the number of children ever born at age 40 serves as an indicator of completed fertility at the end of each woman's childbearing. Although this clearly ignores a small number of births that occur after this age, on average this is only equivalent to a mean difference of 0.03-0.05 children (see appendix table A3.3). The reason for choosing age 40 as the lower limit is because the method chosen here follows the same sample over time, so measuring fertility at a later age (e.g. 45) would reduce the analytical sample size. The reason for choosing 70 as the upper limit is to avoid possible bias due to differences in the mortality of certain immigrant groups.

The UKHLS data can be compared with statistics that are based on registered births in England and Wales (as in table 3.1). However, when doing so it is important to acknowledge that these sources represent different populations. Registered births are recorded at the time of birth, whereas the UKHLS sample represents the fertility of women who are alive and resident in the UK at the time of survey. This provides one explanation for differences that might exist when comparing the analysis undertaken here with analysis that uses other fertility measures, (even when considering the same birth cohorts). Although research on Swedish data suggests that mortality and migration may make little difference to aggregate estimates of fertility, they may have more of an influence when comparing migrants with the native population (Andersson & Sobolev, 2013).

3.3.3 The analytical sample

The main analytical sample is derived from the eligible sample by dropping cases with missing values for the variables under investigation (as well as a small number of cases with discoverable reporting errors). Almost 7% of eligible cases are therefore excluded from the analysis, largely because of missing information on age at birth, partnership history, or parental country of birth (see appendix table A3.1, which includes unrounded frequencies). These exclusions result in a sample size of approximately 11,000 women, including almost 1,400 (12%) who are foreign-born. Of the women who are born in the UK, 11% are from the second generation, defined as those who have at least one parent who was born abroad. Throughout the analysis, these second generation women are combined with the rest of the UK-born population, and this group is either referred to as UK-born, native-born or natives. It is taken to represent the native fertility 'norm', and is the reference group with which immigrants are compared in order to calculate differentials.

In accordance with most of the literature on migrant fertility, immigrants are defined using country of birth and age at migration (e.g.

Andersson, 2004; Bélanger & Gilbert, 2006; Compton & Courbage, 2002; Frank & Heuveline, 2005). These definitions are preferred over other measures, such as ethnicity and intention-to-stay, because they are time constant, and not subject to change as a result of immigration or assimilation (e.g. Burton, Nandi, & Platt, 2010). Appendix tables A3.2 and A3.3 provide descriptive statistics for the analytical sample. Importantly, the sample size is sufficiently large for specific origin (country of birth) groups to be separately identified, and to facilitate the analysis of three groups by age at migration: under 16, 16-25, and 26-35. Even when combined with country of birth, only two migration age groups have a sample size less than 10: Irish women who migrated age 26-35 and non-Jamaican-born Caribbean women who migrated age 26-35.

Another important consideration is the accuracy of birth history information. Although there is no reason to suspect particular problems for the UKHLS, inaccuracies in birth history data have been established elsewhere (Ní Bhrolcháin, Beaujouan, & Murphy, 2011; Potter, 1977). Although female birth histories are typically more accurate than male histories (Rendall, Clarke, Peters, Ranjit, & Verropoulou, 1999), errors are expected to vary systematically, such that women who have completed their fertility may slightly under-report their births, and recent births will be more accurately recalled (Andersson & Sobolev, 2013; Murphy, 2009). However, it is not expected that this will make a material change to any conclusions about immigrant fertility differentials.

Nevertheless, given these known issues, fertility histories were checked using a comparison of two different parts of the UKHLS data. Birth histories were initially obtained using information on non-resident children from each woman's birth history and information on resident children from the woman's household questionnaire. These results were then compared against an alternative calculation using the birth history questions for both resident and non-resident children. Comparisons suggested there was relatively little difference between the two calculations, although the preferred method gave slightly higher estimates of average fertility (appendix table A3.3). As in

previous research (Ní Bhrolcháin et al., 2011), the household questionnaire allowed additional data quality checks. Information from the household relationship matrix was used to triangulate relationships between women, children, and residential fathers (who are typically the woman's partner). As a result of these checks, around 100 cases were corrected for errors.

3.4 Method

3.4.1 Research design

This research investigates two related questions. The first asks how immigrant fertility differentials vary over the life course, and the second asks how these life course differentials vary for different immigrant groups. In order to answer these questions, the analysis uses the UKHLS data to calculate completed fertility profiles for immigrants and natives. It then compares the fertility of immigrants and natives longitudinally, such that the (cumulative) number of children born to immigrants is compared with the number of children born to natives at the same age. This comparison is presented as a ratio, which represents the immigrant fertility differential for a given group of immigrants at a given age.

It is important to note that all births up to age 40 are known for all women in the sample, so for the purposes of this analysis, fertility is complete. For the avoidance of doubt, this means that the analysis includes births before and after migration. Given that births are a rare event over the entire life course, comparisons are made by single years of age. This is important because comparisons of differentials between groups are likely to be highly sensitive to even small changes in childbearing, especially since the average completed fertility of both immigrants and natives is not much more than two children per woman.

Comparing the unweighted counts of foreign-born and UK-born women in the analytical sample, they appear to have similar distributions across several covariates that are relevant for the study of fertility, including education and partnership (see appendix tables A3.1 and A3.3). However, these covariates are not used in this analysis because covariates like education and partnership would not be straightforward to include in this analysis of fertility profiles since they are simultaneous to the fertility process.

3.4.2 Statistical approach

The statistical analysis uses count regression models to estimate children ever born at each age (Agresti, 2002). These models have been used previously by research on migrant fertility (Adserà & Ferrer, 2014a; Adserà et al., 2012; Mayer & Riphahn, 2000). In each stage of the analysis, a set of models are estimated at a range of ages, from 20 to 40, using children ever born (at a given age) as the response variable. As such, each stage begins by estimating a model for the entire analytical sample based on number of children born at age 20, and then repeats this analysis for the same sample at age 21, 22, 23... (etc.), up to age 40. The first stage of the analysis is to estimate a series of models comparing foreign-born and native-born women. In subsequent stages, the analysis is repeated, but using different categorisations for foreign-born women. UK-born natives are always grouped together, and are used as the reference group throughout.

The models are defined as follows: Let Y_{ij} denote the number of children ever born for individual i at age j . As the only explanatory variable, G_i is an indicator variable for immigrant group, which is defined in the same way at each stage of the analysis (i.e. for each set of models that are estimated at each age from 20 to 40), but varies at different stages according to the migrant groups that are investigated. As such, G_j can indicate nativity (i.e. whether native-born or foreign-born), country of birth group, age at migration group, or a group that

indicates both country of birth and age at migration. The outcome is then modelled such that Y_{ij} follows a Poisson distribution with expected value:

$$E(Y_{ij}) = \exp(\alpha_j + \beta_j \mathbf{G}_i)$$

, for $i = 1, \dots, n$, estimated separately for each age $j = 20, \dots, 40$, where β_j is a vector of coefficients for \mathbf{G}_i that vary by age. At age j , a risk ratio for each migrant group, compared to the reference group of UK-born women, is therefore defined as: $IRR_j = \exp(\beta_j)$. These are referred to here as immigrant fertility differentials. The models are estimated so that a ratio above 1.0 is a 'positive' differential, indicating that immigrants have more births than natives on average, and a ratio below 1.0 is a 'negative' differential, indicating immigrants have fewer births on average.

All regressions were estimated using the *svy* command in Stata version 11, to account for the complex survey design of the UKHLS (StataCorp, 2009). This means that the results are adjusted for unit non-response, as well as the fact that immigrants, or more specifically ethnic minority groups, are oversampled in the survey. For comparison, negative binomial models were also estimated, and the estimates and standard errors were virtually identical. Unless stated otherwise, the threshold for significance throughout the rest of this chapter is $p=0.05$ and confidence intervals (often shown in brackets after the estimate) are calculated at the 95% level.

3.5 Results

3.5.1 Average differences across the fertility schedule

Before considering differentials over the life course, it is useful to look at the general fertility trend in differentials for UK-born and foreign-born women using measures that summarise fertility. In table 3.1, the period TFR for a given year is compared with completed fertility for cohorts of women who were born 30 years earlier (as is commonly done elsewhere, e.g. ONS, 2011). Completed

fertility is estimated here using the UKHLS because it has not previously been estimated for the UK, or any of its constituent countries. In table 3.1, but not elsewhere in this article, completed fertility is calculated for England and Wales, rather than the UK. This allows an equivalent comparison with published period TFRs, although this change in coverage makes little difference (see Tromans et al., 2007; Table 1, for the difference it makes to period TFRs), largely because England and Wales accounts for 89% of the UK population by size (ONS, 2014).

Table 3.1: Total period fertility rate (for women aged 15-45) versus completed family size (for women aged 40 plus)

England & Wales		1981	1986 ¹	1991	1996	2001	2006	2011
TFR	UK-born	1.7	1.7	1.8	1.7	1.6	1.8	1.9
	Foreign-born	2.5	2.5	2.4	2.5	2.2	2.4	2.3
	differential	0.8	0.8	0.6	0.8	0.6	0.6	0.4
Completed fertility (+ 30 yrs)	UK-born	2.1	2.0	2.1	2.0	2.1		
	Foreign-born	2.0	2.4	2.1	2.1	2.3		
	differential	-0.1	0.4	0.0	0.1	0.2		

1: Result for 1985. Source: Office for National Statistics and UKHLS data (author's analysis). Coverage: England and Wales (i.e. the UK excluding Scotland and Northern Ireland).

Table 3.1 shows that there is a smaller immigrant fertility differential for completed fertility than for the period TFR. Although foreign-born women have a period TFR that is almost always more than half a child larger than UK-born women, the completed fertility differential is far smaller, and even equals zero for the 1991 comparison. Table 3.1 therefore warns against using the foreign-born period TFR in order to infer completed fertility differentials. This also suggests that the period TFR might not be the most appropriate measure to assess the impact of immigration on population change, at least in the UK. However, as discussed previously, the period TFR may be appropriate for the analysis of some immigrant groups, and the analysis of differentials over the life course can indicate which groups these are if age at migration is included in the analysis. Perhaps more importantly for the analysis that follows, it is important to note that based on table 3.1 alone, researchers might assume that

there are no differences between the fertility of immigrants and natives. In the analysis that follows, the results highlight the simplicity of this assumption, and show that differentials vary considerably over the life course and for different immigrant groups.

3.5.2 Differentials across the fertility schedule

In fact, despite minimal differences in completed fertility, figures 1a and 1b show that at young ages, immigrants have given birth to significantly lower numbers of children than natives. At age 20, the average number of children born by immigrant women is lower than UK-born women by a factor of 0.75. This differential becomes smaller as age increases, but it is not until the middle of their reproductive life course that immigrants catch up toward the native norm. The average differential remains 'negative' at all ages up to 34 (i.e. immigrants have given birth to fewer children than natives), and these negative differentials are significant at the 5% level at all ages under 30. By age 40, foreign-born fertility has 'caught-up' with native fertility, overtaking it slightly, such that the average number of births to foreign-born women is marginally greater by a factor of 1.06 (1.02; 1.11).

Figures 1a and 1b therefore demonstrate the advantage of analysing fertility differentials over the life course. The charts in the rest of this article have the same y-axis as figure 3.2b and show the profile of differentials. However, figure 3.2a shows the actual fertility profiles that are used to calculate the differentials in 3.2b. Given that the sample remains the same at each age, the relationship between differentials over the life course can be compared directly. It is worth noting that differentials are expected to be slightly more sensitive at early ages because levels of childbearing are smaller. Nevertheless, based on the variation in differentials shown in figure 3.2b, it seems reasonable to ask which immigrant groups are responsible for the shape of this profile, and how much heterogeneity lies behind it.

Figure 3.2a: Fertility profiles of children ever born by nativity

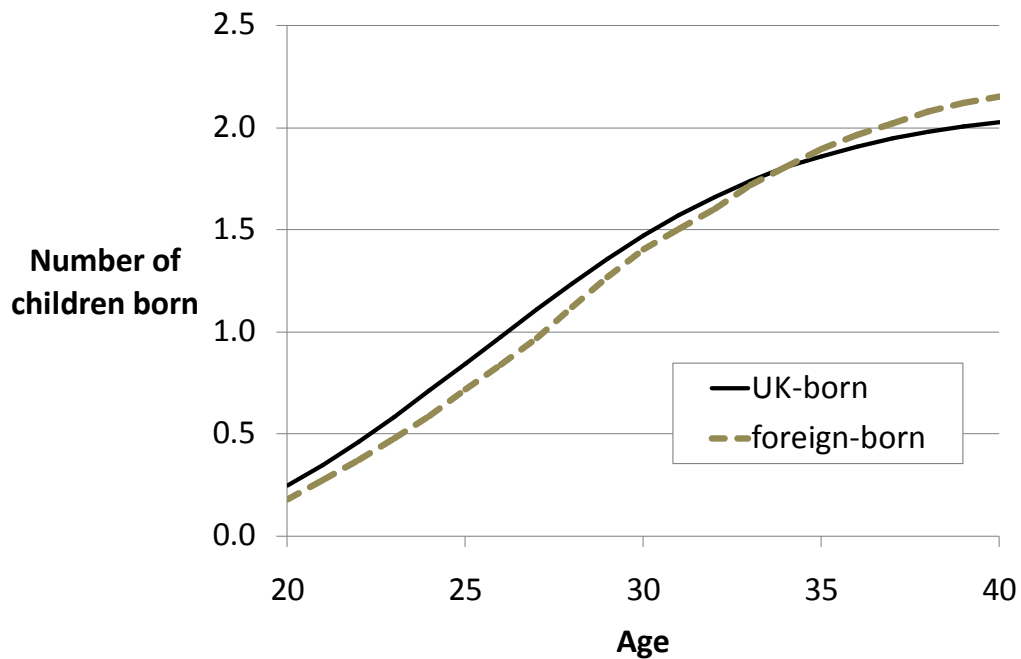
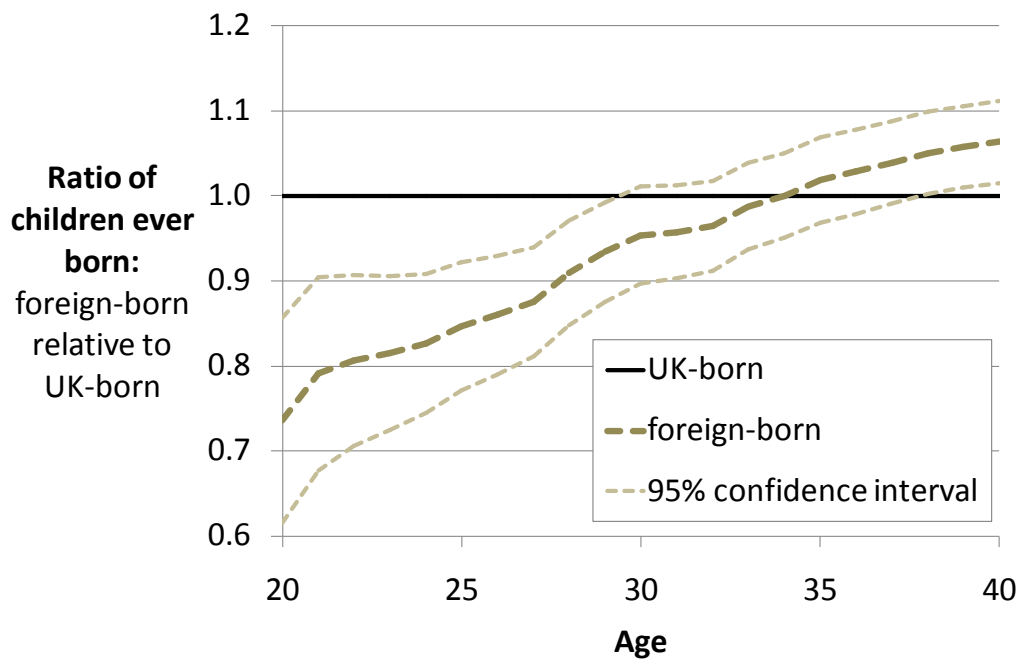


Figure 3.2b: Ratio of children ever born by nativity



Note: Figures 1a and 1b report the results from 21 separate Poisson regression models, although the analytical sample is the same for each model (women born between 1942 and 1971). The ratio of children ever born is obtained from the modelled IRR of foreign-born women relative to UK-born women. UK-born women therefore have a ratio of 1.0 at all ages. Source: UKHLS data (author's analysis).

3.5.3 Variation by country of birth

It is well known that there is a lot of variation in migrant fertility in the UK by country of birth and ethnicity (Adserà et al., 2012; Coleman, 1982, 1994; Coleman et al., 2002; Coleman & Dubuc, 2010; Dubuc, 2012; Dubuc & Haskey, 2010; Iliffe, 1978; Murphy, 1995; Sigle-Rushton, 2008; Waller, Berrington, & Raymer, 2012; Zumpe et al., 2012). Country of birth is an important candidate for explaining variation in migrant fertility. This includes both the changing composition of the migrant population, as well as the changing fertility behaviour of country of birth groups.

Figures 3.3a, 3.3b and 3.3c show that there is considerable variation in the profile of immigrant fertility differentials by country of birth (i.e. immigrant origin). Based on a comparison of origins at age 40, we can identify the origin groups that have the largest completed fertility differentials, and these are shown in figure 3.3a. These immigrants, South Asians and Jamaicans, will therefore make the largest eventual contribution to population size. However, as this analysis shows, they have very different profiles of life course differentials, so their fertility will affect population dynamics in different ways at different ages.

For example, compared with Pakistani women, Bangladeshi women have very similar completed fertility, but far higher differentials at ages under 30. The quantum of fertility at age 20 is almost the same as natives for Pakistani-born women, whereas births to Bangladeshi-born women are (on average) much earlier than both Pakistanis and natives. A similar comparison can be made between women from India and Jamaica, who have very similar completed fertility, but very different profiles, such that the childbearing of Jamaicans begins much earlier (with a significant differential of more than 2.3 at age 20). Overall, these patterns suggest that while Bangladeshis and Pakistanis may eventually make the greatest contribution to population size, Bangladeshis and Jamaicans will have a much earlier impact on population change via their fertility.

Figure 3.3a: Differentials by country of birth for groups with a higher completed fertility than natives

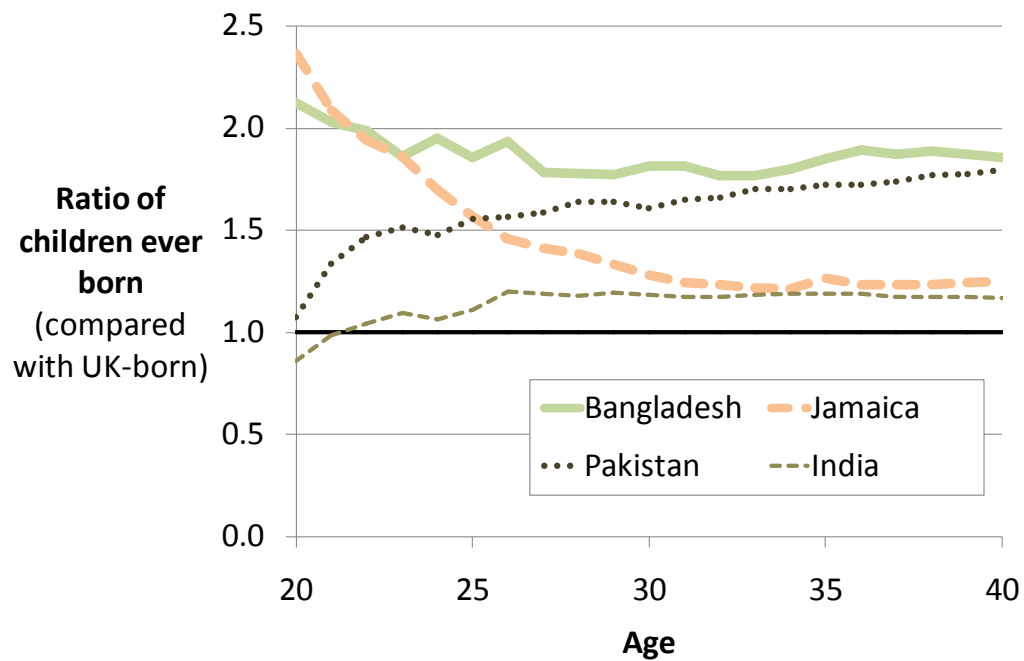


Figure 3.3b: Differentials by country of birth for groups with a similar completed fertility to natives

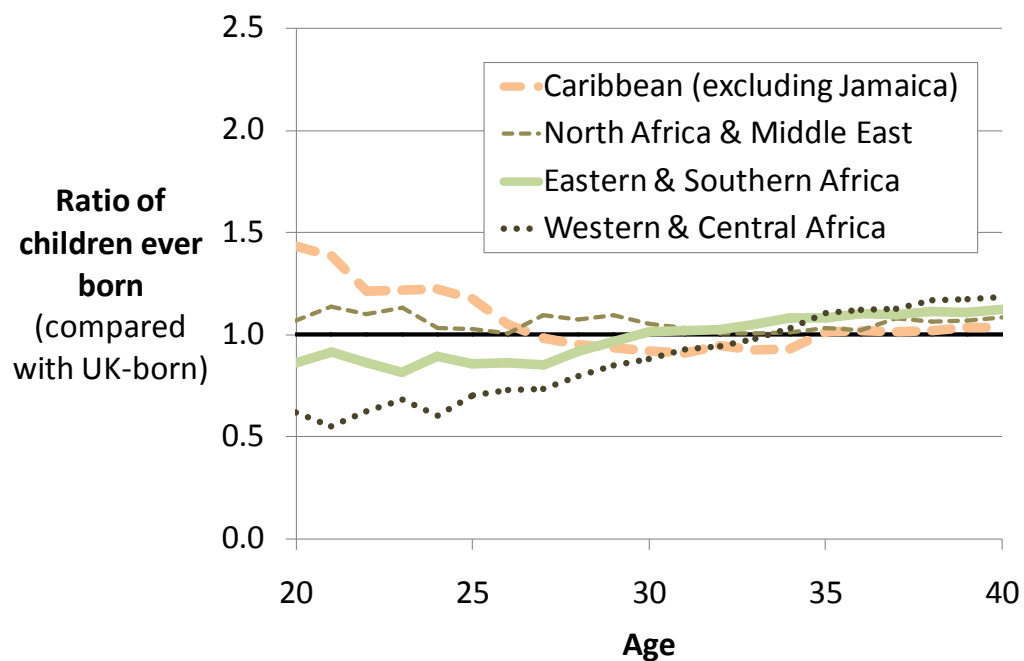
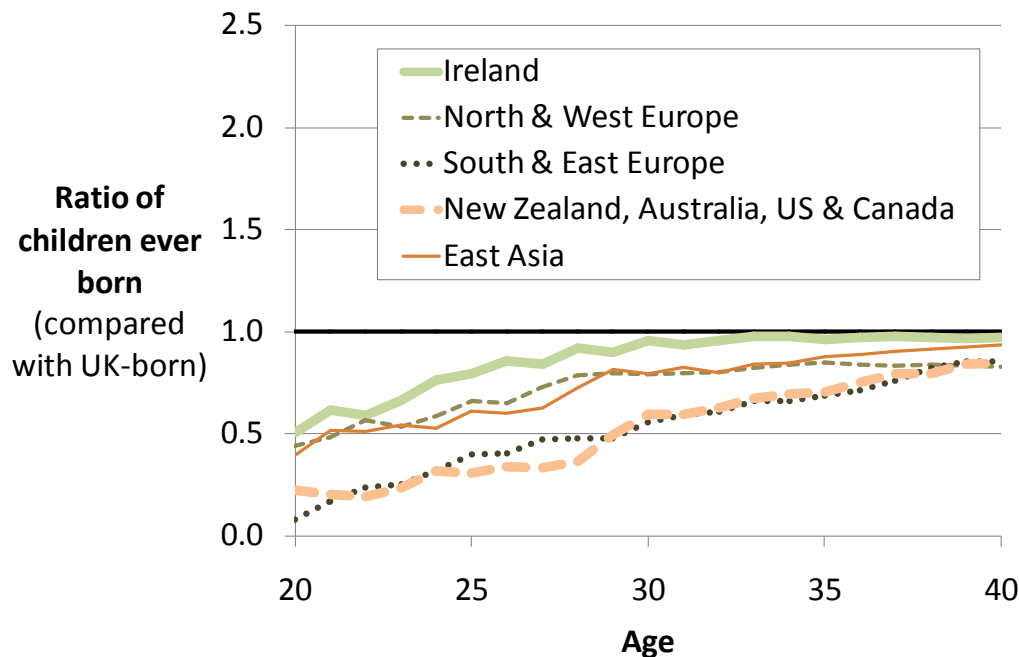


Figure 3.3c: Differentials by country of birth for groups with a lower completed fertility than natives



Note: Results for figures 3.3a-3.3c are obtained from a series of Poisson regression models, where the analytical sample is the same for each model (women born between 1942 and 1971). The reference category for these differentials is UK-born women (who effectively have a differential of 1.0 at all ages). Source: UKHLS data (author's analysis).

For many origin groups differentials are much smaller than those shown in figure 3.3a, and the profile of differentials is more stable over the life course. This is the case for African and Middle Eastern origins, as well as women who were born in the Caribbean outside Jamaica (figure 3.3b). However, even among these aggregated groups, there is evidence of differences in birth timing. Of particular interest is the group of women from Western and Central Africa, who have higher completed fertility than natives, but fewer births than natives at early ages, in both cases larger than the differentials of any other African group.

Instead of exhibiting positive differentials, some origin groups display lower levels of completed fertility to natives (i.e. negative differentials) (figure 3.3c). For these groups, differentials are increasingly negative at earlier ages. This pattern is common among women from origin countries that have either low fertility (e.g. East Asia) or high income (e.g. Ireland). For example, Southern

and Eastern European migrants are much less likely to have children at young ages. At age 20, their average number of children born is lower than natives by a factor of 0.08 (0.01; 0.56). This compares with a factor of 0.85 at age 40 (0.71; 1.02), which although still below 1.0, represents a considerable amount of 'catching up' to the native norm.

For Southern and Eastern European migrants, this pattern may reflect the lower fertility of their origin countries. However, it is almost the same as the profile of differentials for women from the USA and 'Old Commonwealth' countries (New Zealand, Australia and Canada), which suggests that this pattern of childbearing is not necessarily associated with origin fertility norms. An alternative explanation, which could be true for all origin groups in figure 3.3c, is that this pattern of differentials may be driven by the selection of migrants who are more likely to postpone childbearing and end their reproductive lives with fewer children than UK-born natives.

Comparing all thirteen of the origins groups that are analysed here, it is clear that there is considerable heterogeneity among foreign-born women in the UK, not just in terms of their completed fertility differentials, but also their profile of differentials across the life course. One of the important implications of these results is that, although there are a number of countries with higher completed fertility than natives, these all have very different profiles, which suggests they their fertility should be studied separately wherever possible in future research. When studying convergence, which requires the existence of differentials before convergence can begin, these profiles indicate where the largest differentials occur by age and origin. Given the diversity of their profiles at early ages, it would make the most sense to analyse completed fertility for South Asian and Jamaican origins, because this is the stage of the life course where they all exhibit positive differentials.

By comparison, the origin country groups that have a lower completed fertility than natives, including most high income countries, all have very similar patterns of differentials to each other (figure 3.3c). This suggests that it

may be reasonable to group them together, but their lower fertility at earlier ages suggest that research on these origins might best be directed toward the early childbearing ages. This is also true when considering their effect on population dynamics because their low fertility quantum at early ages may have a depressive effect on destination fertility rates, depending upon age at migration.

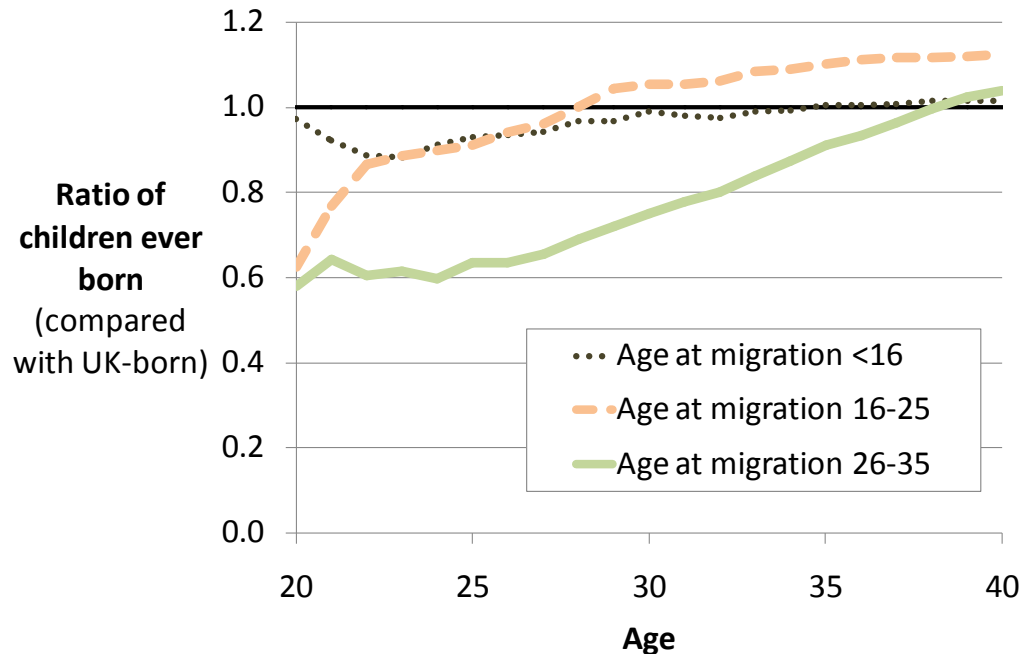
3.5.4 Age at migration

As discussed, age at migration is likely to be linked to changing patterns of immigrant fertility differentials. The majority of immigrants arrive as adults, which means that they migrate after the start of their reproductive years. For example, more than two thirds of immigrants who were born outside the UK and resident in England and Wales in 2011 had an age at arrival between 15 and 44 (ONS, 2012a).

One of the difficulties for assessing fertility differentials for adult migrants is the fact that the timing of their childbearing and their immigration are likely to be associated with each other (Andersson, 2004; Hoem & Nedoluzhko, 2014; Milewski, 2007; Robards, 2012; Toulemon & Mazuy, 2004). This can be contrasted with child migrants, whose fertility is much less likely to be associated with the timing of their migration, not least because they usually arrive before their fertile years begin (e.g. ONS, 2012a). This implies that the differentials for child migrants may provide indicative evidence about the patterns of adult migrant fertility that would have occurred if their migration had occurred earlier. In other words, child migrants represent a tentative counterfactual for adult migrants. This counterfactual is tentative because there are several distinct reasons why the fertility of child migrants may differ from that of adults. For example, it may be due to the fact that, as opposed to adult migrants, the timing of their migration does not disrupt their fertility. On the other hand, the hypothesis of childhood socialisation also predicts that child

migrant fertility will be different, due to their increased exposure to destination norms.

Figure 3.4: Differentials by age at migration



Note: Results are obtained from a series of five Poisson regression models, where the analytical sample is the same for each model (women born between 1942 and 1971). The reference category for these differentials is UK-born women (who effectively have a differential of 1.0 at all ages). Source: UKHLS data (author's analysis).

As shown by figure 3.4, there is less variation in differentials for child migrants, as compared with adult migrants in the UK. Not only is there a lack of variation in differentials over the life course (i.e. the profile is horizontal), but there is almost no evidence of differentials at any age. This is a new finding for the UK, and suggests that child migrants who are resident in the UK have a very similar fertility profile to UK-born women. It also suggests that this is worthy of further investigation (including in the next subsection, 3.5.5).

For adult migrants, it is evident that the profile of their differentials depends upon their age at migration. As with all these results, the differentials in figure 3.4 include births before and after migration, and from this we can see that immigrants who arrive in the UK aged from 16-25 have fewer children than natives at age 20 by a factor of 0.62 (0.48; 0.81). However, by age 25, after all

these women have arrived in the UK, this differential is 0.91 (0.80; 1.04). And by age 29 their average differential has switched from negative to positive (i.e. the ratio has changed from below 1.0 to above). Although further refinement would be required to consider whether births occurred just before, or just after migration, this seems to confirm that there is a strong relationship between the timing of migration and childbirth. In addition, despite the lower fertility of these migrants at early ages, by age 40 they have significantly more children than natives, on average by a factor of 1.12 (1.05; 1.20). This profile can be compared with adult migrants who arrived at ages 26-35. With an average number of children born that is lower than natives at age 20 and age 25, this group exhibit a similar pattern of low fertility prior to migration. Importantly, they also 'catch-up' with native fertility levels by age 40, implying a period of elevated fertility either shortly before or shortly after migration.

Taken as a whole, these results demonstrate the patterns of tempo-variation by age at migration, which may be the cause of tempo-distortion when analysing migrant fertility using samples of women including those who have yet to complete childbearing. They also show the importance of accounting for age at migration when analysing fertility differentials, especially at early ages. Given this variation by age at migration, and the variation observed by country of birth, a useful next step is to see how these two characteristics interact.

Figure 3.5a: Differentials by age at migration and country of birth for groups with a higher completed fertility than natives

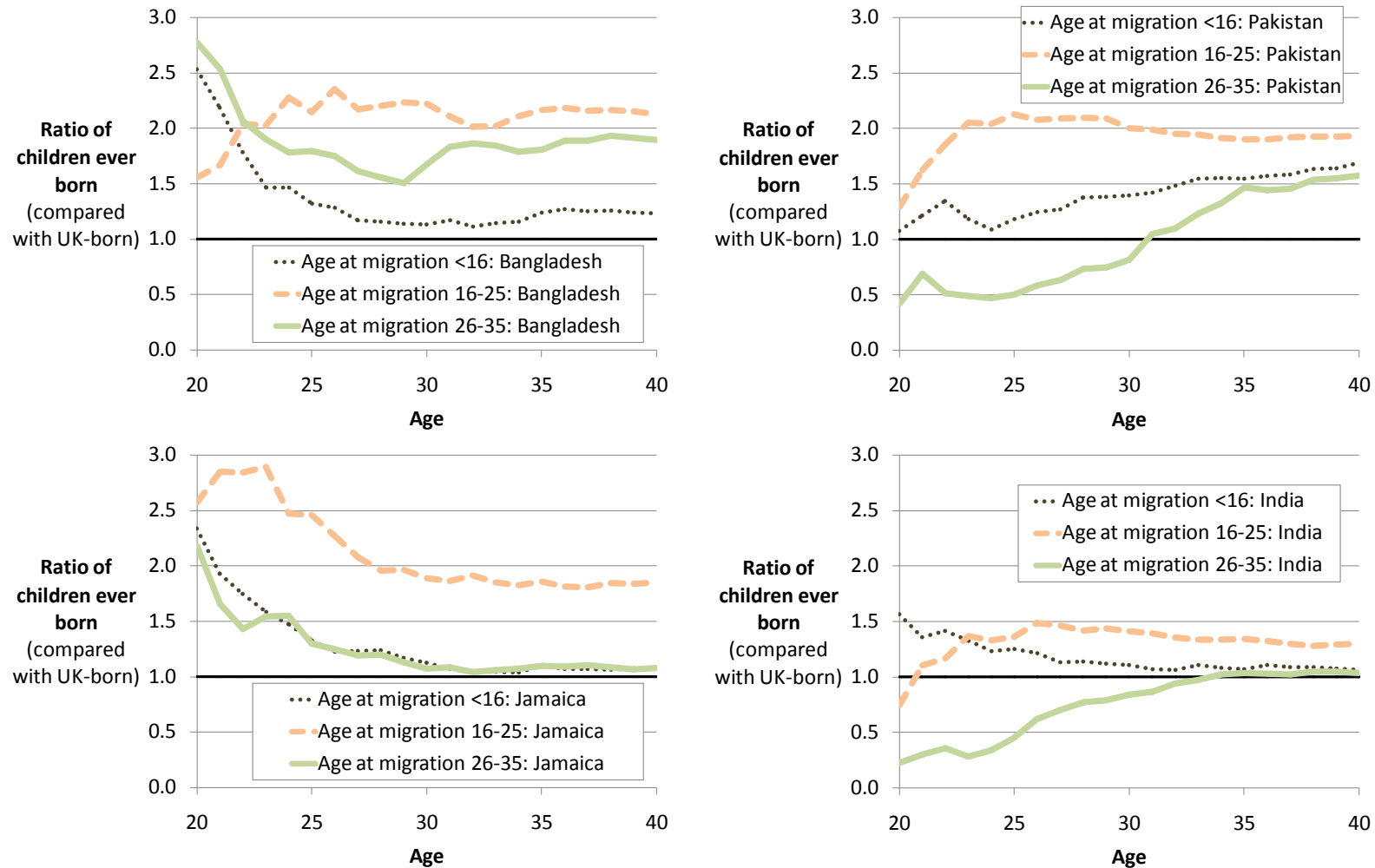


Figure 3.5b: Differentials by age at migration and country of birth for groups with a similar completed fertility to natives

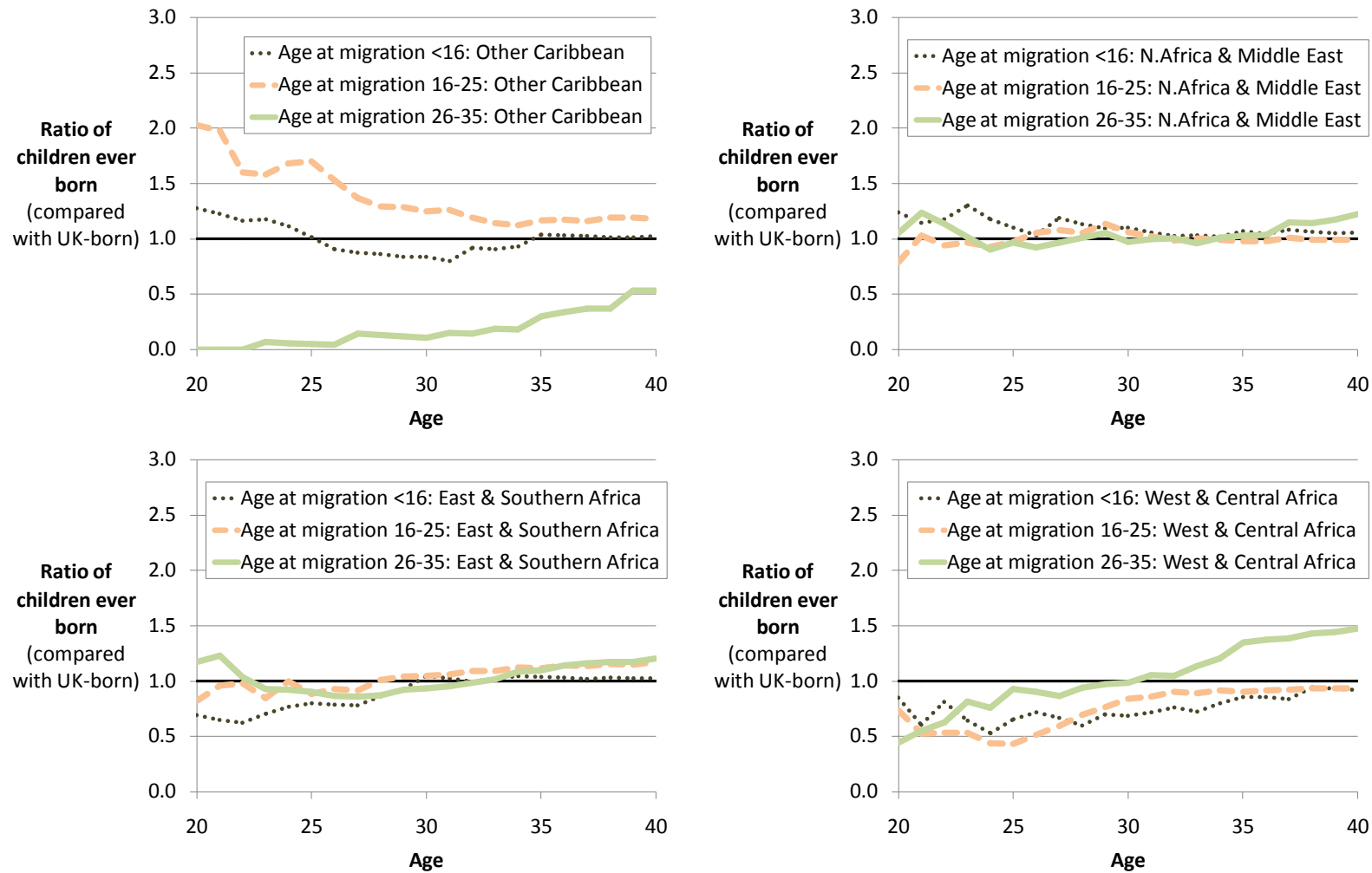
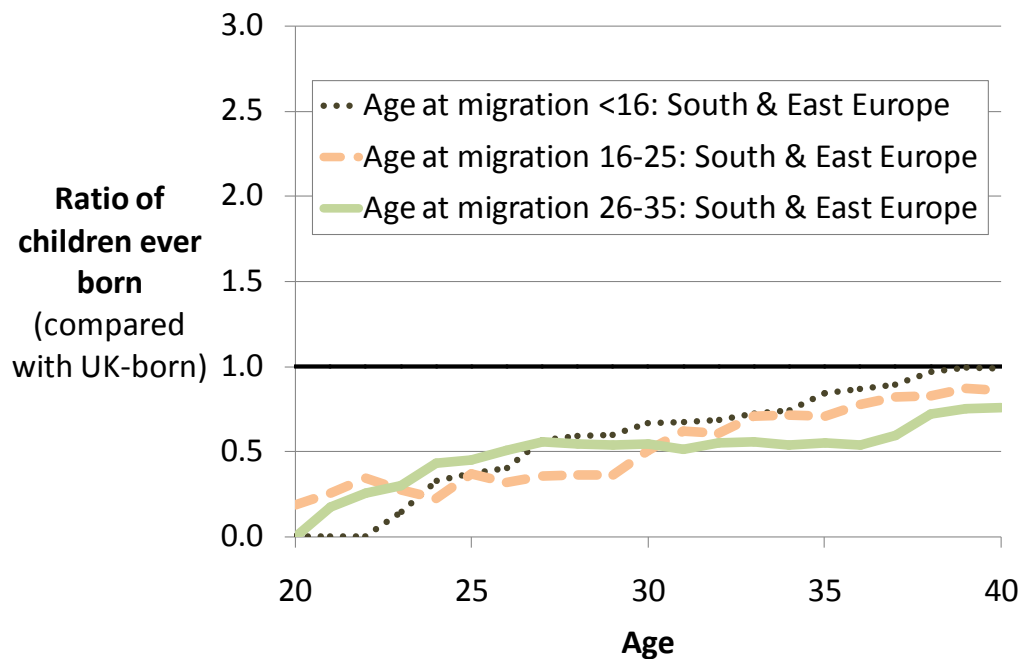


Figure 3.5c: Differentials by age at migration and country of birth for groups with a lower completed fertility than natives



Figure 3.5d: Differentials by age at migration and country of birth for immigrants from South and East Europe



Note: Results are obtained from a series of five Poisson regression models, where the analytical sample is the same for each model (women born between 1942 and 1971). The reference category for these differentials is UK-born women (who effectively have a differential of 1.0 at all ages). Apart from the results for women from South and East Europe, which are presented separately in 3.5d, the origin groups in these figures (3.5a-3.5c) correspond to the groups in figures 3.3a-3.3c. Source: UKHLS data (author's analysis).

3.5.5 The relationship between country of birth and age at migration

The results in figures 3.5a-3.5d show that there is considerable heterogeneity in life course differentials when analysed by country of birth and age at migration. Nevertheless, some general patterns and distinct results can be observed. In general, the child migrants of most origin groups tend to have smaller differentials than adult migrants, and exhibit fertility behaviour that is closer to natives at all stages of the life course. This evidence could support several explanations, including childhood socialisation, or the absence of disruption for child migrants.

The results for the other age at migration groups are less easy to generalise. For origins with large completed fertility differentials, immigrants

who arrive when aged 16-25 have larger differentials than child migrants or those who arrive when aged 26-35 (figure 3.5a). This shows that migrant fertility profiles are not necessarily closer to those of natives with increasing exposure to destination, (otherwise those arriving earlier would have smaller differentials). As elsewhere, there are competing explanations for this result, including that high differentials for those arriving from 16-25 may be due to the selection of women with higher fertility preferences. Nevertheless, for the high completed fertility origins, it is interesting to note that those arriving at ages 26-35 only have the largest differentials for Bangladeshi women in their early 20s. One possible explanation for this result is the higher prevalence of earlier partnership formation among Bangladeshis, as compared to the UK-born population, which may in turn be linked to marriage migration or family reunification for a number of women (Berrington, 1994).

Despite the general pattern for child migrant differentials to be smaller than those of adult migrants across the life course, there are some origins that diverge from this pattern. Child migrants from Jamaica, Bangladesh and India have high differentials at young ages, suggesting an earlier timing of births compared with natives. This suggests that these child migrants may be adopting (or adapting to) the destination norm for completed fertility, but not the norm for age at first birth, perhaps because they have had less time to adapt to native norms at the beginning of the life course. This suggests that it would be useful to investigate adaptation for these groups.

By contrast, Pakistani child migrants show a very different pattern from these origins. The fact that they have almost no differential at early ages, but that their differential steadily increases with age suggests that their contribution to population growth will be very different from other child migrant groups. This also implies that there is a different explanation for their differentials. Almost all hypotheses, except cultural entrenchment, predict that the fertility of child migrants should be the same as (or converge with) native fertility. The most likely explanation for the differentials of Pakistani child migrants may

therefore be cultural entrenchment. Along with child migrants from Bangladesh, the fact that they have significantly higher completed fertility than natives suggests that they may also be the most suitable origins to consider when investigating this hypothesis in the UK.

In the analysis of country of birth only, Jamaicans and Bangladeshis have differentials that indicate earlier childbearing than UK-born natives (figure 3.3a). The analysis by origin and age at migration suggests that this behaviour is driven by different types of immigrants for these different origins. For Bangladeshi women, it is those who migrate early or late in their life course (as children or aged 26-35) who are most likely to have earlier births. Whereas for Jamaicans, it is those who migrate aged 16-25. In fact, this is the only group of Jamaicans who have a significant fertility differential at age 40, thereby indicating that these are the Jamaican immigrants who will have the largest impact on population change. It is also interesting to note, given that Caribbean immigrants are often grouped together, that Jamaicans have very different profiles from other Caribbean immigrants by age at migration (although it should be noted that the number of non-Jamaican-born Caribbean women in the sample who migrated from age 26-35 is quite small).

For African origins, it is interesting to note that differentials are quite similar across the groups that are analysed here. Differentials are small or non-existent at any age at migration for immigrants from North Africa and the Middle East, and the same is true for those from East and Southern Africa, with the exception of child migrants in the early stages of childbearing. Of all the African groups, only West and Central Africa demonstrates a lot of variation by age at migration, with the most distinct pattern being for those arriving aged 26-35. Unlike those who arrive earlier in their life course, these women have significantly higher completed fertility than natives.

For the remaining origin groups (figures 3.5c and 3.5d), who all have lower completed fertility than natives on average, there are many similarities in the patterns of differentials by age at migration. Adult migrants generally

display significantly lower numbers of children born at early childbearing ages, although this difference becomes smaller with age. This can be contrasted with the profile of differentials for child migrants from these groups, which are much closer to the average for natives. The exception is migrants from South and East Europe, where child migrants exhibit the same profile as adult migrants. These results suggest that the timing of migration for South and East European immigrants makes very little difference to their fertility. As noted in previous research, studies of migrant fertility often ignore the fertility of immigrants from origins that have lower fertility than the destination (Castro-Martín & Cortina, 2015). However, as shown here for migrants from South and East Europe to the UK, this may be a particularly interesting group for further study, especially as a group who do not show any evidence of childhood socialisation.

3.6 Conclusion

Although previous research has shown that immigrant fertility differentials vary by country of birth, this study develops new knowledge by demonstrating that there is considerable heterogeneity in differentials, not only for different migrant groups, but also over their life course. The analysis provides a deeper understanding of immigrant fertility in the UK by examining all stages of childbearing. In doing so, it goes beyond what might be learnt from a similar comparison using measures of fertility like first birth risks, period TFRs or completed fertility. The time series of UK period TFR differentials indicates that immigrants have an average differential in excess of half a child per woman, whereas completed fertility differentials suggest an average difference that is much closer to zero (table 3.1). However, both of these estimates mask the complexity of variation in differentials that is evident over the life course for different immigrant groups.

When all immigrants are grouped together, the profile of differentials shows that the largest differences between immigrants and natives are in their early reproductive years (figures 1a and 1b). Differentials gradually reduce in

size over the life course such that immigrants eventually catch up with, and slightly exceed, the native norm. Having examined the variation that underlies this general pattern, it is possible to identify which immigrant groups are most responsible for its shape. At young ages, Bangladeshi and Caribbean women demonstrate the largest positive differentials (figures 3.3a & 3.3b), and most other origin groups have the either the same number of children as natives, or fewer children, even when analysed by age at migration (figures 3.3a-d & 3.5a-d). As such, the aggregate differential for all immigrants (grouped together) at early ages seems to be driven by a general trend in the fertility behaviour of most origin groups, but with some exceptions, including Bangladeshi-born and Caribbean-born women. As age increases, quite a few origin groups catch-up with, or move further above the native norm, thereby also mimicking the aggregate trend. However, this is far from universal, especially when considering variation by country of birth and age at migration. By the end of the reproductive life course, some groups have considerably higher completed fertility, and some considerably lower, as compared with the native norm.

For researchers aiming to understand the impact of migrant fertility on population change, the results imply that they should take account of heterogeneity over the life course, in addition to heterogeneity by immigrant group. This conclusion is likely to be relevant in other destinations, especially those that have immigrants from a range of origins. Of course, it is important to note that these findings are for women who have completed their fertility, and the childbearing of women from later birth cohorts may well be different. Nevertheless, these results provide an empirical foundation on which to base assumptions about future cohorts. In addition, it may be desirable for some researchers to make an assumption that immigrant fertility differentials are constant over the life course, for example when using period TFRs to summarise these differentials. This study shows how to test this assumption, and identifies that only a few immigrant groups in the UK have differentials that do not vary by age, most notably immigrants from the Middle East or North, East, and Southern Africa.

The results also provide indicative evidence for and against some prominent hypotheses and explanations for migrant fertility behaviour. For example, the existence of positive differentials across the life course for child migrants from Pakistan and Bangladesh suggests that their fertility preferences may be culturally entrenched. In contrast to most other origin groups, this is tentative evidence against childhood socialisation, and suggests that these groups may be worth studying in future research. Unlike other origins, child migrants from Pakistan and Bangladesh have a higher completed fertility than natives, so it would be useful to study these groups in order to investigate why this is the case. One explanation may be that their completed fertility is less likely to converge to the native norm over generations, perhaps due to a lack of exposure to native cultural norms.

For many origin groups, there is also indicative evidence of elevated fertility, or at least evidence that suggests the postponement of births to coincide with migration. This analysis is not able to say whether these births are truly postponed (e.g. compared with non-migrants at origin), or whether they occur just before or just after migration. Nevertheless, these results show that for many immigrants there is an increased rate of childbearing in the later stages of their reproductive lives, relative to the timing of native births, and on average the timing of births is later for those who arrive at older ages. This finding is not universal, with an obvious exception being immigrants from Bangladesh who arrive aged 26-35. However, the findings for Bangladeshis may relate to early partnership, and distinct patterns of family reunification (Berrington, 1994; Coleman et al., 2002; Iliffe, 1978; Walvin, 1984), which suggests another useful avenue for further research.

For researchers who are trying to understand convergence, the results help to identify the largest differentials (by group and by age), thereby highlighting the origins and parts of the life course that may be worthy of further investigation. For example, convergence due to intergenerational assimilation is hard to investigate without looking at the second generation

(native-born women with foreign-born parents), but an examination of immigrant profiles can show the first generation groups who exhibit sizeable differentials, and the ages at which these differentials occur, thereby guiding future research. For the UK, these results suggest that an investigation of completed fertility convergence over generations would be most fruitful for Bangladeshis, Pakistanis and Indians.

On the other hand, an investigation of the convergence of first birth timing over generations would be more appropriate for Bangladeshis, Jamaicans and a number of high income origins, in particular South and East Europeans for whom both child and adult migrants exhibit significantly delayed early childbearing as compared with natives. Given the large number of Polish-born women who have recently arrived in the UK, (the majority of whom have yet to complete their childbearing) (ONS, 2013a), this finding may have contemporary relevance, and implies caution should be taken when inferring the stability of fertility differentials for Eastern Europeans.

When interpreting these findings, it is important to note that the percentage of foreign-born migrants who emigrate (and leave the UK) within five years of arrival is around 40% (for those who arrived in the 1980s and 1990s, see: Rendall & Ball, 2004). As such, another reason for these findings might be due to selective return migration. For example, childless women may be more likely to emigrate and return to their origin country (thereby inflating the differentials for those immigrants who remain). However, it is also important to note that this figure is itself an average, and return migration is substantially lower for immigrants from lower income origin countries. For example it is only 15% (within five years) for those from South Asia.

Regardless of the explanation for all of these patterns, the results show that it may be inappropriate to make generalisations about the relationship between quantum and tempo for immigrant fertility, as compared with natives. As such, conclusions about immigrant fertility differentials are very likely to depend upon the way that fertility is measured and the groups that are

investigated. Similarly, the results show that the composition of the migrant population will be very important in determining migrant fertility differentials, and this includes the composition of the samples that are analysed. For example, the analysis of samples that include women who have not yet finished their childbearing may have a material impact on any conclusions about the magnitude of differentials.

References

- Abbasi-Shavazi, M. J., & McDonald, P. (2000). Fertility and multiculturalism: Immigrant fertility in Australia, 1977-1991. *International Migration Review*, 34(1), 215-242.
- Adserà, A., & Ferrer, A. (2014a). Factors influencing the fertility choices of child immigrants in Canada. *Population Studies*, 68(1), 65-79. <http://doi.org/10.1080/00324728.2013.802007>
- Adserà, A., & Ferrer, A. (2014b). The Fertility of Married Immigrant Women to Canada. *International Migration Review*. <http://doi.org/10.1111/imre.12114>
- Adserà, A., Ferrer, A. M., Sigle-Rushton, W., & Wilson, B. (2012). Fertility Patterns of Child Migrants Age at Migration and Ancestry in Comparative Perspective. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 160-189. <http://doi.org/10.1177/0002716212444706>
- Agresti, A. (2002). *Categorical data analysis*. New York: Wiley-Interscience.
- Alba, R., & Nee, V. (2005). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Alders, M. (2000). *Cohort fertility of migrant women in the Netherlands: Developments in fertility of women born in Turkey, Morocco, Suriname, and the Netherlands Antilles and Aruba*. Department of Population Division, Statistics Netherlands, Paper for the BSPS-NVD-URU Conference, Utrecht, 31 August - 1 September, 2000.
- Allen, K., & Warrell, H. (2013, August 8). Baby boom drives UK population growth. *Financial Times*. Retrieved from <http://www.ft.com/cms/s/0/7a42c2de-0008-11e3-9c40-00144feab7de.html#axzz3WIAOxn9O>
- Andersson, G. (2004). Childbearing after Migration: Fertility Patterns of Foreign-born Women in Sweden. *International Migration Review*, 38(2), 747-774.
- Andersson, G., & Scott, K. (2005). Labour-market status and first-time parenthood: The experience of immigrant women in Sweden, 1981-97. *Population Studies*, 59(1), 21-38. <http://doi.org/10.1080/0032472052000332683>
- Andersson, G., & Sobolev, B. (2013). Small Effects of Selective Migration and Selective Survival in Retrospective Studies of Fertility. *European Journal of Population / Revue Européenne de Démographie*, 29(3), 345-354. <http://doi.org/10.1007/s10680-013-9293-6>
- Bagavos, C., Tsimbos, C., & Verropoulou, G. (2007). Native and Migrant Fertility Patterns in Greece: A Cohort Approach. *European Journal of Population / Revue Européenne de Démographie*, 24(3), 245-263. <http://doi.org/10.1007/s10680-007-9142-6>

- Batson, C. D. (2013). Contemporary Fertility Patterns and First-Birth Timing Among Mexican-Origin Women. *Hispanic Journal of Behavioral Sciences*, 35(2), 174–193. <http://doi.org/10.1177/0739986312468086>
- BBC. (2008, August 21). More long-term migrants to UK. *BBC*. Retrieved from <http://news.bbc.co.uk/1/hi/uk/7574382.stm>
- BBC. (2013). Booming birth rate “a strain on NHS midwifery services.” *BBC News*. Retrieved from <http://www.bbc.co.uk/news/health-21120593>
- Bean, F. D., & Swicegood, G. (1985). *Mexican American fertility patterns*. University of Texas Press Austin.
- Bélanger, A., & Gilbert, S. (2006). The fertility of immigrant women and their Canadian-born daughters. In *Report on the Demographic Situation in Canada, 2002* (pp. 127–151). Statistics Canada.
- Berrington, A. (1994). Marriage and family formation among the white and ethnic minority populations in Britain. *Ethnic & Racial Studies*, 17(3), 517–546.
- Bongaarts, J., & Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review*, 24(2), 271–291.
- Burton, J., Nandi, A., & Platt, L. (2010). Measuring ethnicity: challenges and opportunities for survey research. *Ethnic and Racial Studies*, 33(8), 1332–1349. <http://doi.org/10.1080/01419870903527801>
- Castro-Martín, T., & Cortina, C. (2015). Demographic Issues of Intra-European Migration: Destinations, Family and Settlement. *European Journal of Population*, 31(2), 109–125. <http://doi.org/10.1007/s10680-015-9348-y>
- Coleman, D. A. (1982). *Demography of immigrants and minority groups in the United Kingdom: proceedings of the eighteenth annual symposium of the Eugenics Society, London 1981*. Academic Press.
- Coleman, D. A. (1994). Trends in fertility and intermarriage among immigrant populations in Western Europe as measures of integration. *Journal of Biosocial Science*, 26(01), 107–136.
- Coleman, D. A. (2009). The demographic effects of international migration in Europe. *Oxford Review of Economic Policy*, 24(3), 452–476. <http://doi.org/10.1093/oxrep/grn027>
- Coleman, D. A., Compton, P., & Salt, J. (2002). Demography of migrant populations: the case of the United Kingdom. In W. Haug, P. Compton, & Y. Courbage (Eds.), *The demographic characteristics of immigrant populations* (p. 497). Council of Europe Publishing.
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64(1), 19–41. <http://doi.org/10.1080/00324720903391201>
- Compton, P., & Courbage, Y. (2002). Synthesis report. In W. Haug, P. Compton, & Y. Courbage (Eds.), *The demographic characteristics of immigrant populations*. Council of Europe.
- Daley, P. O. (1998). Black Africans in Great Britain: Spatial concentration and segregation. *Urban Studies*, 35(10), 1703–1724.
- Dormon, O. (2014). *Childbearing of UK and non-UK born women living in the UK - 2011 Census data*. Office for National Statistics. Retrieved from http://www.ons.gov.uk/ons/dcp171766_350433.pdf
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>
- Dubuc, S., & Haskey, J. (2010). Ethnicity and Fertility in the United Kingdom. In J. Stillwell & M. Ham (Eds.), *Ethnicity and Integration* (pp. 63–81). Dordrecht: Springer Netherlands.

- Retrieved from
<http://www.springerlink.com.gate2.library.lse.ac.uk/content/x75262030127783t/>
- Easton, M. (2012, July 16). What is the UK's optimum population? *BBC*. Retrieved from
<http://www.bbc.co.uk/news/uk-18854762>
- Elder, G. H. (1985). *Life course dynamics: trajectories and transitions, 1968-1980*. Cornell University Press.
- Elder, G. H., Jr. (1975). Age Differentiation and the Life Course. *Annual Review of Sociology*, 1, 165-190.
- Elder, G. H., & Rockwell, R. C. (1979). The Life-Course and Human Development: An Ecological Perspective. *International Journal of Behavioral Development*, 2(1), 1-21.
<http://doi.org/10.1177/016502547900200101>
- Fokkema, T., de Valk, H., de Beer, J., & Van Duin, C. (2008). The Netherlands: Childbearing within the context of a "Poldermodel" society. *Demographic Research*, 19, 743-794.
<http://doi.org/10.4054/DemRes.2008.19.21>
- Foner, N. (2009). Gender and Migration: West Indians in Comparative Perspective. *International Migration*, 47(1), 3-29. <http://doi.org/10.1111/j.1468-2435.2008.00480.x>
- Frank, R., & Heuveline, P. (2005). A cross-over in Mexican and Mexican-American fertility rates. *Demographic Research*, 12, 77-104. <http://doi.org/10.4054/DemRes.2005.12.4>
- Friedlander, D., & Goldscheider, C. (1978). Immigration, Social Change and Cohort Fertility in Israel. *Population Studies*, 32(2), 299-317. <http://doi.org/10.2307/2173563>
- Garssen, J., & Nicolaas, H. (2008). Fertility of Turkish and Moroccan women in the Netherlands: Adjustment to native level within one generation. *Demographic Research*, 19, 1249-1280.
<http://doi.org/10.4054/DemRes.2008.19.33>
- Geronimus, A. T., & Thompson, J. P. (2004). To denigrate, ignore or disrupt: Racial Inequality in Health and the Impact of a Policy-induced Breakdown of African American Communities. *Du Bois Review: Social Science Research on Race*, 1(02), 247-279.
<http://doi.org/10.1017/S1742058X04042031>
- Goisis, A., & Sigle-Rushton, W. (2014). Childbearing Postponement and Child Well-being: A Complex and Varied Relationship? *Demography*, 51(5), 1821-1841.
<http://doi.org/10.1007/s13524-014-0335-4>
- Goldscheider, C., & Uhlenberg, P. R. (1969). Minority Group Status and Fertility. *American Journal of Sociology*, 74(4), 361-372.
- Goldstein, S., & Goldstein, A. (1981). The Impact of Migration on Fertility: an 'Own Children' Analysis for Thailand. *Population Studies*, 35(2), 265-284.
<http://doi.org/10.2307/2174939>
- Goldstein, S., & Goldstein, A. (1983). Migration and Fertility in Peninsular Malaysia. *A Rand Note, Prepared for The Agency for International Development, [N-1860-AID]*. Retrieved from
<http://www.rand.org/pubs/notes/N1860.html>
- Grant, J., Hoorens, S., Sivadasan, S., van het Loo, M., DaVanzo, J., Hale, L., ... Butz, W. (2004). *Low fertility and population ageing: causes consequences and policy options*. RAND Corporation.
- Harbison, S. F., & Weishaar, M. (1981). Samoan Migrant Fertility: Adaptation and Selection. *Human Organization*, 40(3), 268-273.
- Harper, S., & Hamblin, K. (2014). *International Handbook on Ageing and Public Policy*. Edward Elgar Publishing.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.

- Hervitz, H. M. (1985). Selectivity, adaptation, or disruption? A comparison of alternative hypotheses on the effects of migration on fertility: The case of Brazil. *International Migration Review*, 19(2), 293–317.
- Hill, L. E., & Johnson, H. P. (2004). Fertility Changes Among Immigrants: Generations, Neighborhoods, and Personal Characteristics. *Social Science Quarterly*, 85(3), 811–827. <http://doi.org/10.1111/j.0038-4941.2004.00246.x>
- Hoem, J. M., & Nedoluzhko, L. (2014). *Pre-and Post-migration Fertility* (Stockholm Research Reports in Demography). Stockholm University. Retrieved from http://www.suda.su.se/SRRD/SRRD_2014_18.pdf
- Hornsby-Smith, M. P., & Dale, A. (1988). The Assimilation of Irish Immigrants in England. *The British Journal of Sociology*, 39(4), 519–544. <http://doi.org/10.2307/590499>
- Horsfield, G. (2005). International Migration. In *Focus on People and Migration* (pp. 115–119). London: Palgrave Macmillan.
- Illiffe, L. (1978). Estimated fertility rates of Asian and West Indian immigrant women in Britain, 1969–74. *Journal of Biosocial Science*, 10(2), 189–197.
- Kahn, J. R. (1988). Immigrant Selectivity and Fertility Adaptation in the United States. *Social Forces*, 67, 108.
- Kahn, J. R. (1994). Immigrant and native fertility during the 1980s: adaptation and expectations for the future. *International Migration Review*, 28(3), 501–519.
- Kulu, H. (2005). Migration and Fertility: Competing Hypotheses Re-examined. *European Journal of Population / Revue Européenne de Démographie*, 21(1), 51–87. <http://doi.org/10.1007/s10680-005-3581-8>
- Kulu, H., & González-Ferrer, A. (2014). Family Dynamics Among Immigrants and Their Descendants in Europe: Current Research and Opportunities. *European Journal of Population*, 30(4), 411–435. <http://doi.org/10.1007/s10680-014-9322-0>
- Lübke, C. (2015). How Migration Affects the Timing of Childbearing: The Transition to a First Birth Among Polish Women in Britain. *European Journal of Population*, 31(1), 1–20. <http://doi.org/10.1007/s10680-014-9326-9>
- Massey, D. S. (1981). Dimensions of the New Immigration to the United States and the Prospects for Assimilation. *Annual Review of Sociology*, 7, 57–85. <http://doi.org/10.1146/annurev.so.07.080181.000421>
- Mayer, J., & Riphahn, R. T. (2000). Fertility assimilation of immigrants: Evidence from count data models. *Journal of Population Economics*, 13(2), 241–261.
- McLanahan, S. (2004). Diverging destinies: How children are faring under the second demographic transition. *Demography*, 41(4), 607–627. <http://doi.org/10.1353/dem.2004.0033>
- Milewski, N. (2007). First child of immigrant workers and their descendants in West Germany: Interrelation of events, disruption, or adaptation? *Demographic Research*, 17, 859–896. <http://doi.org/10.4054/DemRes.2007.17.29>
- Milewski, N. (2010). *Fertility of immigrants: a two-generational approach in Germany*. Springer Berlin Heidelberg. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-642-03705-4_1
- Milewski, N. (2011). Transition to a first birth among Turkish second-generation migrants in Western Europe. *Advances in Life Course Research*, 16(4), 178–189. <http://doi.org/10.1016/j.alcr.2011.09.002>
- Murphy, M. (1995). The impact of migration on population composition: The British case. In S. Voets, J. J. Schoorl, & B. de Bruijn (Eds.), *The demographic consequences of international*

- migration (pp. 207–224). The Hague: Netherlands Interdisciplinary Demographic Institute.
- Murphy, M. (2009). Where have all the children gone? Women's reports of more childlessness at older ages than when they were younger in a large-scale continuous household survey in Britain. *Population Studies*, 63(2), 115–133. <http://doi.org/10.1080/00324720902917238>
- Mussino, E., & Van Raalte, A. A. (2012). Immigrant Fertility: A Comparative Study between Italy and Russia. *International Migration*. <http://doi.org/10.1111/j.1468-2435.2012.00760.x>
- Ng, E., & Nault, F. (1997). Fertility among Recent Immigrant Women to Canada, 1991: An Examination of the Disruption Hypothesis. *International Migration*, 35(4), 559–580. <http://doi.org/10.1111/1468-2435.00027>
- Ní Bhrolcháin, M., Beaujouan, É., & Murphy, M. (2011). Sources of error in reported childlessness in a continuous British household survey. *Population Studies*, 65(3), 305–318. <http://doi.org/10.1080/00324728.2011.607901>
- ONS. (2011). *Fertility assumptions: 2010-based national population projections*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_233451.pdf
- ONS. (2012a). *International migrants in England and Wales, 2011*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_290335.pdf
- ONS. (2012b). *Population by Country of Birth and Nationality Report*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_277619.pdf
- ONS. (2013a). *Detailed country of birth and nationality analysis from the 2011 Census of England and Wales*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_310441.pdf
- ONS. (2013b). *Immigration Patterns of Non-UK Born Populations in England and Wales in 2011*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_346219.pdf
- ONS. (2014). *Annual Mid-year Population Estimates, 2013*. Retrieved from http://www.ons.gov.uk/ons/dcp171778_367167.pdf
- Parrado, E. A. (2011). How High is Hispanic/Mexican Fertility in the United States? Immigration and Tempo Considerations. *Demography*, 48(3), 1059–1080. <http://doi.org/10.1007/s13524-011-0045-0>
- Parrado, E. A., & Flippen, C. A. (2012). Hispanic fertility, immigration, and race in the twenty-first century. *Race and Social Problems*, 4(1), 18–30. <http://doi.org/10.1007/s12552-012-9063-9>
- Parrado, E. A., & Morgan, S. P. (2008). Intergenerational Fertility Among Hispanic Women: New Evidence of Immigrant Assimilation. *Demography*, 45(3), 651–671.
- Peach, C. (2006). South Asian migration and settlement in Great Britain, 1951–2001. *Contemporary South Asia*, 15(2), 133–146.
- Potter, J. E. (1977). Problems in Using Birth-History Analysis to Estimate Trends in Fertility. *Population Studies*, 31(2), 335–364. <http://doi.org/10.2307/2173921>
- Pressat, R. (1985). *The Dictionary of Demography*. (C. Wilson, Ed.). Oxford: Basil Blackwell.
- Rendall, M. S., & Ball, D. J. (2004). Immigration, emigration and the ageing of the overseas-born population in the United Kingdom. *Population Trends*, 116, 18–27.
- Rendall, M. S., Clarke, L., Peters, H. E., Ranjit, N., & Verropoulou, G. (1999). Incomplete reporting of men's fertility in the united states and Britain: A research note. *Demography*, 36(1), 135–144. <http://doi.org/10.2307/2648139>

- Rendall, M. S., & Salt, J. (2005). The foreign-born population. *Focus on People and Migration*, London: Palgrave Macmillan, 131–152.
- Ritchey, P. N. (1975). The Effect of Minority Group Status on Fertility: A Re-examination of Concepts. *Population Studies*, 29(2), 249–257. <http://doi.org/10.2307/2173510>
- Robards, J. (2012, June). *Estimating the fertility of recent migrants to England and Wales (1991-2001) – is there an elevated level of fertility after migration?* Presented at the European Population Conference, Stockholm University.
- Robards, J., & Berrington, A. (2015). *The fertility of recent migrants to England and Wales: interrelationships between migration and birth timing* (ESRC Centre for Population Change Working Papers No. 65). Southampton, GB: University of Southampton. Retrieved from http://www.cpc.ac.uk/publications/cpc_working_papers/pdf/2015_WP65_The_fertility_of_recent_migrants_to_England_and_Wales.pdf
- Rosenwaike, I. (1973). Two generations of Italians in America: their fertility experience. *International Migration Review*, 7(3), 271–280.
- Ryder, N. B. (1980). Components of temporal variations in American fertility. In R. W. Hiorns (Ed.), *Demographic patterns in developed societies* (pp. 15–54). London: Taylor and Francis.
- Sedghi, A. (2014). Is it true there is a “startling” rise in the birthrate of British Muslims? *The Guardian*. Retrieved from <http://www.theguardian.com/news/datablog/2014/jan/10/rise-british-muslim-birthrate-the-times-census>
- Sevak, P., & Schmidt, L. (2008). *Immigrant-Native Fertility and Mortality Differentials in the United States*. Retrieved from <http://deepblue.lib.umich.edu/handle/2027.42/61807>
- Sigle-Rushton, W. (2008). England and Wales: Stable fertility and pronounced social status differences. *Demographic Research*, 19(15), 455–502.
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225–248. <http://doi.org/10.4054/DemRes.2008.19.9>
- Sobotka, T., & Lutz, W. (2011). Misleading Policy Messages Derived from the Period TFR: Should We Stop Using It? *Comparative Population Studies*, 35(3). Retrieved from <http://www.comparativepopulationstudies.de/index.php/CPoS/article/view/54>
- StataCorp. (2009). *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP.
- Statistics New Zealand. (2012). *Demographic trends: 2011*. Wellington: Statistics New Zealand ISSN.
- Stephen, E. H., & Bean, F. D. (1992). Assimilation, Disruption and the Fertility of Mexican-Origin Women in the United States. *International Migration Review*, 26(1), 67–88. <http://doi.org/10.2307/2546937>
- Toulemon, L. (2004). Fertility among immigrant women: new data, a new approach. *Population & Societies*, 400. Retrieved from http://www.ined.fr/en/publications/pop_soc/bdd/publication/540/
- Toulemon, L. (2006). *Fertility Among Immigrant Women in France: New Data, a New Approach*. Prepared for Population Association of American 2006 Annual Meeting, Los Angeles, California, March 30–April 1, 2006.
- Toulemon, L., & Mazuy, M. (2004). *Comment prendre en compte l'âge à l'arrivée et la durée de séjour en France dans la mesure de la fécondité des immigrants?* INED. Retrieved from http://www.ined.fr/fichier/t_publication/1053/publi_pdf1_120.pdf
- Tromans, N., Natamba, E., & Jefferies, J. (2007). Have women born outside the UK driven the rise in UK births since 2001? *Population Trends*, 136, 28–42.

- University of Essex. (2011). Institute for Social and Economic Research and National Centre for Social Research, Understanding Society: Wave 1, 2009-2010 [computer file]. 2nd Edition. Colchester, Essex: UK Data Archive [distributor], November 2011. SN: 6614, <http://dx.doi.org/10.5255/UKDA-SN-6614-2>.
- Waller, L., Berrington, A., & Raymer, J. (2012). Understanding recent migrant fertility in the United Kingdom. *CPC Working Papers*.
- Waller, L., Berrington, A., & Raymer, J. (2014). New insights into the fertility patterns of recent Polish migrants in the United Kingdom. *Journal of Population Research*, 31(2), 1–20. <http://doi.org/10.1007/s12546-014-9125-5>
- Walvin, J. (1984). *Passage to Britain: immigration in British history and politics*. Penguin in association with Belitha Press.
- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31(1), 105–125. <http://doi.org/10.1146/annurev.soc.29.010202.100026>
- Young, C. M. (1991). Changes in the Demographic Behaviour of Migrants in Australia and the Transition between Generations. *Population Studies*, 45(1), 67–89.
- Zarate, A., & Zarate, A. U. de. (1975). On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. *International Migration Review*, 9(2), 115–156.
- Zumpe, J., Dormon, O., & Jefferies, J. (2012). *Childbearing among UK born and non-UK born women living in the UK*. ONS. Retrieved from http://www.ons.gov.uk/ons/dcp171766_283876.pdf

Appendix tables

TABLE A3.1: DERIVATION OF THE ANALYTICAL SAMPLE

Category	frequency	%	% of eligible
Responses to wave 1 of the UKHLS	50,994		
Non-eligible cases	39,086	77	
male respondents	23,202	45	
female proxy responses	1,093	2	
non-proxy women aged under 40	10,874	21	
non-proxy women 70+	3,554	7	
non-proxy women 40-70 who migrated when aged 36+	363	1	
Eligible cases	11,908	23	
Eligible cases dropped from the analysis (in the order shown)			
missing age at migration	22		0.2
missing parental country of birth (one or both)	94		0.8
missing age at birth for any children	117		1.0
age at birth error for any children	10		0.1
missing age for one or more partnership history events	564		4.7
missing education	5		0.0
Analytical sample	11,096		93.2

Source: UKHLS data (author's analysis).

TABLE A3.2: DESCRIPTION OF THE ANALYTICAL SAMPLE

Category	UK-born (native)		foreign-born	
	frequency	%	frequency	%
Survey year				
2009	4,974	51	614	45
2010	4,422	45	709	52
2011	328	3	49	4
Birth cohort				
1942-1951	2,999	31	281	20
1952-1961	3,261	34	474	35
1962-1971	3,464	36	617	45
Education				
Higher education	3,007	31	525	38
High school (e.g. A levels)	726	7	96	7
GCSE or equivalent	3,238	33	336	24
No education	2,753	28	415	30
Age at migration				
Under 16 (child migrant)			449	33
16-25			551	40
26-35			372	27
Any children born before migrated?				
Yes			277	20
No			1,095	80
Total sample	9,724	100	1,372	100

Source: UKHLS data (author's analysis).

TABLE A3.2: DESCRIPTION OF THE ANALYTICAL SAMPLE [CONTINUED]

Category		UK-born (native)		foreign-born	
		frequency	%	frequency	%
Country of birth					
UK	All	9,724	100		
	Ancestral natives	8,660	89		
	2nd generation	1,064	11		
	Ireland			83	6
	India			174	13
	Pakistan			132	10
	Bangladesh			78	6
	Jamaica			97	7
	Other Caribbean			67	5
	NZ, Aus, US & Canada			61	4
	North & West Europe			81	6
	South & East Europe			49	4
	N. Africa and Middle East			73	5
	West & Central Africa			121	9
	East & Southern Africa			187	14
	East Asia			89	6
	Other countries			80	6
Total sample		9,724	100	1,372	100

Source: UKHLS data (author's analysis).

TABLE A3.3: AGE-SPECIFIC CHARACTERISTICS

Category	UK-born (native)		foreign-born	
	frequency (or mean)	%	frequency (or mean)	%
Mean number of children (unweighted)				
at age 20	0.25		0.24	
at age 30	1.48		1.62	
at age 40	2.03		2.44	
at age 50 (or oldest age)	2.06		2.49	
at age 50 (histories only) ²	2.04		2.47	
Mean number of children (weighted) ¹				
at age 20	0.25		0.18	
at age 30	1.47		1.40	
at age 40	2.02		2.15	
at age 50 (or oldest age)	2.05		2.19	
at age 50 (histories only) ²	2.03		2.17	
Partnership status at age 40				
No partner	1,896	19	258	19
Cohabiting	894	9	75	5
Married	6,934	71	1,039	76
Partnership history at age 40				
Never partnered	529	5	96	7
Cohabited, never married	837	9	84	6
Married, never cohabited	5,273	54	909	66
Married, has cohabited	3,085	32	283	21
Total sample	9,724	100	1,372	100

1: calculated taking account of the survey design; 2: resident children estimated from history questions, rather than household questionnaire; Source: UKHLS data (author's analysis).

4. Intergenerational assimilation of completed fertility: Comparing the convergence of different origin groups

Abstract

Contemporary studies of assimilation have recognized that the lasting effects of immigration can only be understood by looking beyond the first generation. At the same time, most high income countries have received immigrants from an increasingly diverse range of origin countries, thus placing a premium on knowledge about intergenerational assimilation and how it varies for different migrant groups. This paper carries out a test of intergenerational assimilation in the UK for different origin groups by comparing the completed fertility of first and second generation women against the native norm. This allows variation in completed fertility convergence to be established, and different origin groups to be compared and contrasted using a consistent statistical approach. Completed fertility is estimated for the UK using survey estimation and count regression models. The results show evidence of intergenerational assimilation for some origins, in particular women from Ireland and Jamaica, a result which might be explained by childhood socialisation. Yet the results also show no evidence of assimilation for some origin groups. This includes evidence of divergence from the native norm for the descendants of immigrants from North Africa and the Middle East, and significantly higher completed fertility for second generation Pakistanis and Bangladeshis, which is evidence in support of culturally entrenched fertility norms. The ability to establish this distinction in a reliable manner, including estimates of statistical uncertainty, demonstrates the advantage of this method for comparing the assimilation of different origin groups.

4.1 Introduction

As many authors have shown, it is not possible to evaluate the impacts of migration, how these impacts change over time, or how they will transform society, without knowing the extent to which the descendants of immigrants are integrating or assimilating toward mainstream native norms (Alba & Nee, 2005; Crul & Vermeulen, 2003; Heath, Rethon, & Kilpi, 2008; Portes, Fernández-Kelly, & Haller, 2005; Portes & Rumbaut, 2001; Portes & Zhou, 1993; Rumbaut & Portes, 2001; Thomson & Crul, 2007; Vermeulen, 2010; Waters & Jiménez, 2005; Zhou, 1997). This intergenerational perspective has been applied to a range of assimilation outcomes, and the most commonly studied include: partnership, fertility, social mobility, segregation, income, and language (Alba & Nee, 2005; Berry, 2005; Massey, 1981; Portes & Rumbaut, 2001; Rumbaut & Portes, 2001; Thomson & Crul, 2007; Waters & Jiménez, 2005). The central question for most of this research is whether, and to what extent, the descendants of immigrants are adopting mainstream behavioural norms (Alba & Nee, 1997, 2005; Glazer, 1993; Gordon, 1964; Park & Burgess, 1921; Portes & Zhou, 1993; Yinger, 1981). The answer is important, not only because it indicates the impact that migration has on society, but also because it shows the impact that society has on the lives of migrants.

Motivated by these interests, a number of studies have investigated the intergenerational assimilation of fertility. This predicts that migrant fertility differentials will become smaller and disappear across generations, thereby converging with the mainstream norm. The earliest research on intergenerational assimilation shows evidence in support of this type of convergence (Friedlander & Goldscheider, 1978; Goldscheider, 1965, 1967; Goldstein & Goldscheider, 1968; J. A. Hill, 1913; Rosenwaike, 1973), with only rare exceptions (Uhlenberg, 1973). But more recently the findings of different studies have often produced conflicting results. Although some studies have found that fertility differentials are smaller for the second generation than the first generation (e.g. Dubuc, 2012; L. E. Hill & Johnson, 2004; Landale & Huan,

1996; Parrado & Morgan, 2008; Stephen & Bean, 1992), there is also a body of evidence which suggests that migrant fertility differentials do not decline across generations (e.g. Bean, Swicegood, & Berg, 2000; Carter, 2000; Frank & Heuveline, 2005; Stephen, 1989; Swicegood & Morgan, 2002).

As argued here, this apparent contradiction indicates the need for new research, in particular research that takes a more comparative approach. There are several possible reasons why the findings of previous studies may contradict each other. On the one hand, this might be due to their focus on different populations, not least the fact that studies often consider different time periods, different migrant origins, or different destinations. It is hard to assess the importance of these issues because of a lack of comparative research. On the other hand, or in addition, these contradictory findings might be the result of differences in the ways that intergenerational fertility assimilation has been analysed. For example, they may be due to differences in fertility measurement or the methods that have been used to make comparisons across generations. Recent research on the intergenerational assimilation of Mexican and Hispanic fertility in the US has shown that the choice of method can have a sizeable influence on the conclusions of research (Parrado & Morgan, 2008). In particular, research has often analysed number of children born using samples that include women who have yet to complete their childbearing (e.g. women aged 15-45). Studies have shown that the use of such samples can overestimate the size of migrant fertility differentials (Parrado, 2011), and this may be an explanation for contradictory findings, especially as compared with research on completed fertility (Parrado & Morgan, 2008).

Despite the benefits of using completed fertility to analyse convergence over generations, in particular to estimate differences in number of children born, only a small number of studies have examined the intergenerational assimilation of completed fertility. Almost all of these studies have focused on the US (with the exception of Young (1991) who studies Australia), and together they have found evidence that completed fertility converges across generations

for Jews (Goldscheider, 1965; Goldstein & Goldscheider, 1968), Italian Americans (Rosenwaike, 1973), and Hispanic or Mexican Americans (Parrado & Morgan, 2008). All of these studies support the prediction of (straight-line) assimilation theory (Alba & Nee, 1997). However, even though these findings point in a consistent direction, it is difficult to compare them, not least because they use different methods and study different periods. Among other things, this suggests the need for comparative research to show the extent to which generational convergence varies across origin groups.

By comparing the generational convergence of different origin groups, it is possible to show the extent to which generalisations about assimilation are appropriate. In addition, such an analysis can lay the foundations for future research, including research that tries to explain why convergence occurs. If particular groups show evidence of convergence, then this suggests their fertility is being influenced by the destination, for example through a process of childhood socialisation. Alternatively, for those groups that show sustained fertility differentials and an absence of convergence, then this suggests evidence of cultural entrenchment, for example due to residential segregation. In either case, such evidence indicates a direction for future research. As well as helping to distinguish between competing explanations for convergence, knowledge about origin heterogeneity can also demonstrate the long-run impact of migrant fertility on population dynamics. For example, if fertility differentials persist across migrant generations then this will have an influence on population growth, which may in turn have implications for a number of policy areas, including those relating to pensions, jobs and services (Jonsson & Rendall, 2004; Sobotka, 2008).

Given the importance of these issues, this study sets out to study the intergenerational assimilation of fertility in order to develop a deeper understanding of the long-run contribution of migrants to population size. At the same time, this study seeks to develop insights about the impact that society has on the lives of migrants, in particular how this impact changes across

generations, and how such changes vary by ancestral origin group. Based on these motivations, the aim of this paper is to compare the intergenerational assimilation of completed fertility for different origin groups in the UK. The next section of this paper (4.2) provides additional background and motivation for a study of intergenerational assimilation and fertility. It also explains the type of fertility convergence that this theory predicts, and provides a justification for analysing completed fertility. Section 4.3 then discusses the UK data, including the advantages of studying the UK. Not least among these is the fact that the UK has a long and diverse history of migration, which makes it an ideal context for studying the completed fertility of the descendants of immigrants from different origins. The fourth section (4.4) describes the analysis, which uses an approach that allows the identification of completed fertility convergence for different origins including estimates of statistical uncertainty. This is followed by section 4.5, which describes the results, and section 4.6, which discusses the conclusions and their implications.

4.2 Background

4.2.1 The importance of assimilation

Since the 1960s, the majority of countries in North America and Western Europe have experienced substantial changes in migration patterns (Alba & Nee, 2005; Coleman, 2009; Edmonston, 2010; Haug, Compton, & Courbage, 2002; Rumbaut & Portes, 2001). Not only has the size of first and second generation populations grown to unprecedented levels, but these migrant populations now reflect a much wider diversity of ancestral origin countries than ever before (Bouvier & Gardner, 1986; Crul & Vermeulen, 2003; Edmonston, 2010; European Commission, 2011; Gibson, 1992; Hirschman, 2005; Statistics Canada, 2006). The magnitude of these changes has led to vigorous debate – in public, political, and academic spheres – over the economic, demographic and societal impacts of immigration on destination countries (Geddes, 2003; Hatton & Williamson,

2005; Hirschman, 2005, 2006; Koehler, Laczko, Aghazarm, & Schad, 2010; Livi Bacci, 2012; Massey, 1999, 2005; Massey, Durand, & Malone, 2003; Picot, 2008). For example, migration has been proposed and disputed as a solution to the effects of population ageing (UN, 2000), and it has been debated whether or not immigrants are a burden on welfare and public services (Nannestad, 2007).

In order to understand the impacts of migration, research has begun to recognise that the lasting effects of immigration – be they social, economic or demographic – can only be understood by looking beyond the first generation (e.g. Crul & Vermeulen, 2003; Hirschman, 2005; Portes & Rumbaut, 2001; Thomson & Crul, 2007). This has led to an increased interest in assimilation theory as a framework for understanding the social outcomes of the descendants of immigrants. Although assimilation is often used to make predictions referring to first generation migrants, it also makes predictions about the convergence of migrant behaviour across generations (Alba & Nee, 1997; Yinger, 1981; Zhou, 1997). Some assimilation theorists have even suggested that conclusions about assimilation cannot be reached in absence of an intergenerational perspective (Alba & Nee, 2005).

Alongside this growing interest in the descendants of immigrants, researchers have begun to recognise that assimilation varies considerably for different origin groups, especially in European destinations (Crul & Doornik, 2003; Crul & Vermeulen, 2003; Heath et al., 2008; Simon, 2003; Thomson & Crul, 2007; Worbs, 2003). The fact that assimilation varies by origin makes it increasingly difficult to generalise about the assimilation of migrants without stating which migrant groups are being considered. It also means that there is a need for research that describes this variation and allows consistent comparisons between origin groups.

For demographers, these recent trends in assimilation research have not gone unnoticed, and this is particularly evident with respect to research on migrant fertility. Beyond the number of immigrants who arrive or leave a destination, the childbearing of immigrants and their descendants is the most

important determinant of the impact of migration on population size, and this has led to increasing interest in the fertility of both immigrants and their descendants (Beaujot, 2002; Coleman, 2002, 2006; Feld, 2000; Jonsson & Rendall, 2004; Parrado, 2011; Sobotka, 2008). This interest has been particularly notable in Europe, where the second generation have been found to have distinct patterns of partnership and fertility behaviour (Kulu & González-Ferrer, 2014). Given the wide range of origins that are common across European countries, demographers have also become increasingly interested in the heterogeneity of behaviour by origin group, for both immigrants and their descendants. For fertility, this is evidenced by an increasing awareness of the lack of research that has examined this topic (Haug et al., 2002; Kulu & González-Ferrer, 2014; Sobotka, 2008).

4.2.2 What does intergenerational assimilation predict for fertility?

Assimilation theory has defined and interpreted the concept of assimilation in a variety of different ways (e.g. Alba & Nee, 2005; Brubaker, 2001; Glazer, 1993; Portes & Zhou, 1993; Yinger, 1981; Zhou, 1997). For the purposes of this study, it is important to make clear the distinction between individual and intergenerational assimilation. Although assimilation theory predicts the convergence of migrant fertility over an individual life course, (often referred to as adaptation, e.g. Milewski, 2010), it also predicts generational convergence, which is the subject of study here (e.g. Goldstein & Goldscheider, 1968; Rosenwaike, 1973). It has been noted that studies of fertility assimilation have tended to focus on adaptation, rather than taking an intergenerational perspective (Bean et al., 2000; Haug et al., 2002; Milewski, 2010; Parrado & Morgan, 2008; Sobotka, 2008). In part, this may be a result of the additional data requirements when estimating fertility for the descendants of immigrants. Nevertheless, this may also explain why there is some inconsistency in the methods that have been used to analyse generational convergence (as discussed in chapter 2).

In general, assimilation predicts a process of convergence, where convergence can be defined as the decline, and eventual disappearance, of differences between a given migrant or ethnic group and the mainstream destination norm (Alba & Nee, 1997). This paper refers to these differences as differentials, and follows the majority of the literature on fertility assimilation in measuring the mainstream norm using the average fertility of ancestral natives (defined in section 4.3.2) (e.g. Parrado & Morgan, 2008). When focussing on intergenerational assimilation, this refines the concept of convergence so that it refers to the changes in differentials over generations. This means that when intergenerational assimilation is applied to fertility, for example, there will be a smaller fertility differential for the second generation, as compared with first generation migrants. Although this is almost a usable definition of convergence, what it does not clarify, however, is what is meant by fertility.

For any test of fertility convergence, it is important to choose a measure of fertility that aligns with the aims of research. Aside from the aim to explore the heterogeneity of assimilation by migrant origin, this research is interested in fertility assimilation for two main reasons. The first is to gain a deeper understanding of the long-run contribution of migrants to population size, and the second is to develop insights about the impact that society has on the changing lives of migrants over generations.

It is for these reasons that this research chooses to study completed fertility. If research on fertility assimilation sets out to understand migrant contributions to population size, and how these change over generations, then completed fertility would seem to be the most suitable measure. Notwithstanding the mortality of children, completed fertility represents a migrant's lifetime contribution to population size. However, despite the appropriateness of completed fertility for this aim, it is important to recognise that, when taken to its logical conclusion, fertility assimilation refers to the entire fertility profile. The concept of assimilation represents the comprehensive adoption of mainstream or native norms (Alba & Nee, 2005), which suggests

that there will be no differences between migrants and natives. It follows that the end result of fertility assimilation is a situation where migrants and natives have not just the same completed fertility, but also the same fertility over their entire life course (i.e. the same completed fertility profiles). This means they would have exactly the same number of births (quantum), and the same timing of these births (tempo).

Completed fertility may therefore represent a second-best choice for an ideal analysis of assimilation. Nonetheless, it provides an initial step in the assessment of intergenerational assimilation. By examining the convergence of completed fertility, it is possible to make a clear assessment of assimilation with respect to numbers of children born, which is the sum of reproductive life course decisions. This is also easier to interpret than an analysis which studies fertility before childbearing is complete. Previous research does not appear to have investigated the issues that are associated with estimating the intergenerational assimilation of fertility profiles. However, research has shown first generation fertility differentials can be misleading when comparing number of children born using samples of women who have not all completed fertility (Parrado, 2011; Toulemon & Mazuy, 2004).

4.2.3 Evaluating completed fertility convergence over generations

It appears that only a handful of previous research has studied the convergence of completed fertility across migrant generations (Goldscheider, 1965; Goldstein & Goldscheider, 1968; Parrado & Morgan, 2008; Rosenwaike, 1973; Young, 1991), and apart from Young's study of Australia, all of these studies focus on the US. In contrast to the others, the most recent of these devotes a considerable amount of discussion to the choice of method for evaluating completed fertility convergence over generations (Parrado & Morgan, 2008). In essence, the method involves asking whether the second generation are closer than the first generation to native fertility norms. If the second generation is closer to the

native norm, then this can be referred to as evidence of convergence over generations. However, it also argues that when the focus is on intergenerational assimilation, generational convergence should also *“more closely approximate a comparison of immigrant women with those of their daughters’ and granddaughters’ generation”* (Parrado & Morgan, 2008, p. 651). What this means is that, rather than making a cross-sectional comparison of the first and second generation from the same birth cohort, tests of intergenerational assimilation require generations to be compared across lagged birth cohorts (Smith, 2003, 2006; Waters & Jiménez, 2005). In other words, the second generation should be compared with first generation migrants who belong to their parents’ birth cohort.

Informed by Mannheim’s discussion of generations (1952), Goldstein and Goldscheider were the first to study fertility assimilation by comparing generations across lagged birth cohorts (Goldscheider, 1965; Goldstein & Goldscheider, 1968). More recently, research on a range of social outcomes has suggested that a cross-sectional comparison of generations may provide misleading evidence about intergenerational assimilation (Parrado & Morgan, 2008; Smith, 2003, 2006; Waters & Jiménez, 2005). For example, although some research has suggested that there is no evidence of generational fertility convergence for Hispanic and Mexican Americans (e.g. Bean et al., 2000; Frank & Heuveline, 2005), this has been shown to be due to the use of cross-sectional comparisons of generations, rather than comparisons of generations across birth cohorts (over time and generations) (Parrado & Morgan, 2008). It is for these reasons that a ‘lagged generations’ approach is taken here.

4.2.4 Other theories that are linked to generational convergence

Fertility assimilation was first discussed over 100 years ago (J. A. Hill, 1913), and since then the literature has developed a number of hypotheses that relate to the fertility of immigrants and their descendants (Coleman, 1994; Goldberg, 1959, 1960; Goldscheider & Uhlenberg, 1969; Goldstein & Goldstein, 1981;

Hervitz, 1985; Kulu, 2005; Ritchey, 1975; Zarate & Zarate, 1975). However, only a limited number of these make predictions that relate to generational convergence. These are the hypotheses of adaptation, childhood socialisation, and cultural entrenchment (Abbasi-Shavazi & McDonald, 2000; Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969; Goldstein & Goldstein, 1983; Hervitz, 1985). Descriptions of these hypotheses vary across the literature, so the definitions given here inevitably involve some element of subjectivity. Nevertheless, explicit definitions are as follows.

The childhood socialisation hypothesis is based on the premise that fertility norms are developed during childhood (due to the country context of socialisation) (Hervitz, 1985). For first generation adults therefore, it predicts that their fertility norms are established prior to migration, and will therefore be different from the native norm, except for immigrants from countries with a similar fertility as their destination. On the other hand, for child migrants and the second generation, it predicts that their fertility will not be different from that of natives, essentially because they have spent their childhood in the destination.

In contrast to childhood socialisation, cultural entrenchment predicts that convergence might not occur for some migrant groups because their fertility preferences are 'culturally entrenched'. There is a long history of research that aims to explain migrant fertility using hypotheses based on cultural explanations (Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969). Unfortunately, the predictions of these hypotheses have often been ambiguous, making them hard to falsify (a point alluded to by Coleman, 1994; Forste & Tienda, 1996). However, cultural entrenchment is defined here as a falsifiable hypothesis that builds upon the use of cultural hypotheses in previous research (Abbasi-Shavazi & McDonald, 2000; Forste & Tienda, 1996). As such, it predicts that the second and subsequent generations of some origin groups will have different fertility from the native norm, due to the influence of sub-cultural norms and a lack of exposure to the mainstream norm.

Unlike the other two hypotheses, it is difficult to test adaptation with an investigation of intergenerational assimilation, because adaptation refers to the convergence of fertility over the life course of first generation migrants (Milewski, 2010). As pointed out elsewhere, adaptation is not straightforward to investigate, in particular for adult migrants (see chapter 2). However, it is most commonly interpreted as predicting the fertility of first generation adults will be no different from the native norm after 10 years (Hervitz, 1985). Immigrants may differ in their birth timing, for example if migration disrupts childbearing, but they are expected to rapidly conform to native norms after arrival (Goldstein & Goldstein, 1983; Hervitz, 1985). It could be argued that this implies there will be no completed fertility differential for first generation migrants. In this paper, such a situation is referred to as potentially indicative of adaptation, although there are at least several competing explanations for why this might not be a result of adaptive behaviour (including selection and reverse causality) (Harbison & Weishaar, 1981; Toulemon, 2006).

4.3 Data

4.3.1 A study of the UK

In order to carry out a comparison of completed fertility convergence for different migrant origins, this paper focuses on the UK. As a case study, the UK is advantageous because, as a consequence of past immigration, it has a large, diverse, and well-established migrant population (Rendall & Salt, 2005; Walvin, 1984; Zumpe, Dormon, & Jefferies, 2012). This allows the estimation of completed fertility for a range of origin groups, for both the first and second generation. A further advantage of studying the UK, given that the only similar research has focused on the US, is that this offers the chance to make a comparison of findings in different destinations.

Similar to many European countries, the UK has experienced recent increases in net migration, in particular since the A8 countries joined the

European Union in 2004 (ONS, 2012b). Results from the 2011 Census of England and Wales show a 62% growth in the foreign-born population since 2001 (ONS, 2012a), and estimates for the whole UK indicate that 12% of the population in 2011 was born abroad (ONS, 2012c). Although recent trends may be less relevant for a study of completed fertility, they have nevertheless stimulated a contemporary interest in the social outcomes of immigrants and their descendants, including their fertility (Easton, 2011, 2012, 2013).

There is limited evidence about migrant fertility in the UK, in particular with respect to long-run trends or the descendants of immigrants. Previous research shows that the UK period TFR has fallen for many ethnic minority groups since the 1970s, in particular Pakistani and Bangladeshi women (Coleman, 1994; Coleman & Dubuc, 2010; Dubuc, 2009, 2012; Dubuc & Haskey, 2010; Iliffe, 1978; Sigle-Rushton, 2008). Furthermore, Dubuc has shown that, when making a cross-sectional comparison between generations for South-Asian ethnicities, the period TFR of the second generation is closer to the UK average than the period TFR of the first generation (Dubuc, 2012). As highlighted for other contexts (Parrado, 2011; Toulemon, 2004, 2006), most UK research does not consider (or control for) the timing of migration, which may have an influence on analyses using period TFRs. However, some research shows that age-specific fertility rates are highest for migrants who have recently arrived in England and Wales (Robards, 2012), and the fertility of child migrants to England and Wales increases with age at migration (Adserà et al., 2012). Also important for the study undertaken here, is evidence that shows fertility patterns vary by country of ancestry (Adserà et al., 2012; Coleman, 1994; Dubuc, 2012; Iliffe, 1978; Sigle-Rushton, 2008). This is particularly the case for completed fertility, where analysis shows that there is considerable variation in migrant fertility differentials over the life course for different origin groups in the UK (see chapter 3).

This study makes use of data from the first wave of *Understanding Society* (also called the UK Household Longitudinal Study, or UKHLS), which

constitutes a representative sample of approximately 40,000 households in the UK (Buck & McFall, 2011). This source is particularly useful because it allows the identification of different migrant generations, the estimation of completed fertility, and the identification of a range of ancestral origin groups. The first wave of UKHLS data includes around 60,000 adults who were surveyed between 2009 and 2011. Importantly, approximately 10% of this sample is part of an ethnic minority boost, which means that the first and second generation are overrepresented.

In this study, generations are defined using country of birth and age at migration according to the most common definitions in the literature (e.g. Bélanger & Gilbert, 2006; Frank & Heuveline, 2005; Parrado & Morgan, 2008). As such, this paper does not use ethnicity to define ancestral groups. This is largely because ethnicity is not just a determinant, but also an outcome of assimilation (Schwartz, Unger, Zamboanga, & Szapocznik, 2010). Ethnicity is almost always self-reported and therefore dependent upon self-identification (with the common exceptions being proxy respondents and children, both of whom are excluded here). Alongside assimilation, ethnicity is dependent upon the process of psychological acculturation that may occur for each migrant generation (Berry, 1997; Rudmin, 2003; Schwartz et al., 2010). Furthermore, it is strongly related to each individual's combination of parental ethnicities (Voas, 2009).

4.3.2 The analytical sample

The analytical sample used here is restricted to women born between 1922 and 1971. This provides a suitable range for the sample to be split into two birth cohort groups: 1922-1951 and 1952-1971. The mid-points of these two groups are 25 years apart, which facilitates the comparison over time between lagged birth cohorts (discussed further below). The migrant generations that are analysed here are defined as follows:

- *first generation adult migrants are foreign-born women who arrive when aged 16+*
- *the second generation are UK-born women with one or more foreign-born parent*
- *ancestral natives are UK-born women with two UK-born parents*

Appendix table A4.1 shows the cases that are excluded from the analytical sample because of ineligibility or due to missing data. In order to make the results easier to interpret for first generation migrants, the sample excludes child migrants and foreign-born women with UK-born parents. The inclusion of child migrants as a separate group is not possible with this data source because the sample size is too small to allow child migrants to be disaggregated by country of birth. On the other hand, foreign-born women with UK-born parents are excluded because it is difficult to assess the extent to which these women have been exposed to either foreign or native fertility norms.

For the second generation, cases are dropped if women have parents who were born in two different country of birth groups. Cases are also dropped from the sample if they are surveyed by proxy, or if they are missing information on parental country of birth, fertility history, or the covariates used in the analysis. This results in a sample size of 14,252 women who are assumed to have completed their fertility, including 461 first generation adult migrants born between 1922 and 1951, and 870 second generation women born between 1952 and 1971.

It is known that birth histories in UK surveys can contain reporting errors (Murphy, 2009; Ní Bhrolcháin, Beaujouan, & Murphy, 2011). Furthermore, research has investigated the reliability of UK data sources, and shown the importance of accurate fertility measurement for research on migrant fertility (Dubuc, 2009; Robards, Berrington, & Hinde, 2011; Wilson, 2011). However, there is no published evidence on the quality of the UKHLS birth history data, and there is no reason to expect errors in birth histories to be systematically different for migrants and natives.

4.4 Method

4.4.1 Testing generational convergence

The aim here is to investigate intergenerational assimilation by asking whether the generational convergence of completed fertility occurs in the UK. The method builds upon US research that considers single ancestral groups (Goldscheider, 1965; Goldstein & Goldscheider, 1968; Parrado & Morgan, 2008; Rosenwaike, 1973), and develops an approach that makes a statistical comparison for multiple ancestries. Taking this into consideration, and using the above definitions, generational convergence is therefore defined here as follows:

Generational convergence occurs when the difference between the completed fertility of first generation adult migrants and ancestral natives, for a given birth cohort group (G1), is larger than the difference between the completed fertility of the second generation and ancestral natives, for a birth cohort group born 25 years later (G2).

Thus, a comparison is made across generations, as though we were comparing first generation migrants (G1) with their children, but in this case their children are represented by second generation women born 25 years later (G2). The use of 25 years as an appropriate gap between generations could be contested, but this value is chosen because it matches that used elsewhere (Parrado & Morgan, 2008).

4.4.2 Additional hypotheses

In addition to testing generational convergence, as the prediction of intergenerational assimilation, two other migrant fertility hypotheses are evaluated here. Based on the definitions already given, their predictions are defined as follows:

Childhood socialisation: *A significant difference between the fertility of ancestral natives and first generation migrants, but no significant difference between the fertility of ancestral natives and the second generation.*

Cultural entrenchment: *A significant difference between the fertility of ancestral natives and the second generation.*

In addition to evidence of these hypotheses, results are highlighted if there is no significant difference between the fertility of ancestral natives and first generation migrants, in part because this might be indicative of adaptation.

Considering all of these hypotheses, it would appear that childhood socialisation is almost synonymous with the definition of generational convergence given here. Like convergence, childhood socialisation is evident when first generation fertility is different from the native norm but second generation fertility is not. However, as defined here the difference between socialisation and assimilation is that the former does not require a direct comparison between generations in order to be supported.

On the other hand, adaptation and entrenchment represent two possible explanations for a lack of convergence. Generational convergence may not be evident because the completed fertility of some second generation groups remains different from the native norm, a situation which is evidence of cultural entrenchment. Generational convergence may also not be evident because there is no difference in completed fertility between natives and first generation migrants, a situation which might be explained by the fact that assimilation or adaptation has already occurred within one generation. It should be pointed out that these examples do not represent conformation of the hypotheses. For example, it may be that similarities or differences between migrants and natives reflect patterns of selection or different social characteristics, (both of which are discussed further in the methods section below).

It is perhaps also worth noting that this analysis places a priority on establishing whether convergence does or does not occur, with the additional goal of testing the hypotheses that make predictions for different generations. Causal explanations for convergence therefore fall outside the remit of this study. However, this is not to say that the (causal) influence of migrant origin is irrelevant here, largely because it is implicit in the theories and explanations that are investigated. The influence of ancestral culture is therefore an integral theoretical component of this research. However, if assimilation theory (or socialisation) and alternative explanations like adaptation and cultural entrenchment are to be distinguished, the first step (taken here) is to test explicit descriptive predictions. The results of this first step can then be used to guide future research. This includes the comparison of migrant origin groups, which can demonstrate the groups that may be worth investigating further.

Another implication of this lack of focus on causal explanations and origin fertility is that reverse causality and selection, two processes that have been used to explain migrant fertility, are not focal concerns for this research (Forste & Tienda, 1996; Sobotka, 2008; Toulemon, 2004, 2006). There is no doubt that selection will be manifest across the various migration processes that dictate which migrants are resident in the UK (at the time of survey). However, the presence or absence of reverse causality or selection does not prevent an assessment of whether convergence does or does not occur.

Related to this is the possibility that differences in the completed fertility of migrant generations could be explained by differences in the social characteristics of these generations (Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969; Sobotka, 2008). This explanation is briefly considered here with an examination of education and partnership history. In essence the main analysis, which estimates completed fertility by origin and birth cohort, is repeated with the addition of 'control' variables for education and partnership history. This has the effect of changing the comparison between migrants and natives (i.e. the calculation of migrant fertility differentials) to be conditional on

these controls. This is viewed here as a form of standardisation that helps to show how likely it is that the main results might be explained by social characteristics. However, the results are considered tentative, not least because of the limited number of controls that are used, the fact that they are simultaneous with fertility, and because the main aim is to estimate descriptive patterns of convergence.

4.4.3 Variables and model specification

The analytical sample includes women aged 40 and above, and their fertility is measured using children ever born. This is assumed to represent completed fertility. The UKHLS data measures women's fertility using information from birth history questions that are answered by respondents. Country of birth, parental country of birth, and birth cohort are used to define migrant generations and ancestral natives. The two migrant populations that are compared here are first generation adult migrants born between 1922 and 1951, and second generation women born between 1952 and 1971. These groups were chosen primarily to ensure all women were aged 40 and above, because 1971 was the latest birth cohort included in the sample, and in order to maintain an average lag of approximately 25 years between generations.

The reference group for all migrant/native comparisons is ancestral natives: UK-born women with two UK-born parents. Before comparing migrant generations, their differentials are calculated. Each generation is first compared against the average completed fertility for ancestral natives in the same birth cohort as the migrant generation, (although this comparison group is altered when the control variables are added to the analysis). After this, the resultant differentials are compared in order to discover which generation, if any, is closer to the native norm of their birth cohort.

Unweighted frequencies and percentages are shown in appendix table A4.1, weighted percentages are shown in appendix table A4.2, and aggregate estimates of mean completed fertility are shown in figure 4.1. The rest of the

analysis uses count regression models to investigate the effects of origin and ancestry (Agresti, 2002). These models have been shown elsewhere to be appropriate for modelling birth counts in order to evaluate migrant fertility (Adserà et al., 2012; Mayer & Riphahn, 2000). All weighted estimates and all regression models were estimated using the *svy* command in Stata version 11 to account for the complex survey design of the UKHLS (StataCorp, 2009). This means that results take into account unit non-response and the survey design, including the fact that migrants are oversampled. Results are therefore representative of the UK population.

The regression models are defined as follows: Let subscript j denote a generation-ancestry group, e.g. first generation Irish adult migrants, second generation Irish migrants, etc. Let subscript k denote birth cohort, \mathbf{X}_{ijk} is a vector of individual-level covariates, and Y_{ijk} is the number of children ever born at age 40. The outcome is then modelled such that Y_{ijk} follows a Poisson distribution with expected value: $E(Y_{ijk}) = \exp(\alpha + \beta\mathbf{X}_{ijk} + \gamma_j + \theta_k + \rho_{jk})$, for an individual i from group j and cohort k , where β is a vector of coefficients for \mathbf{X}_{ijk} , and α, γ, θ and ρ are other parameters with the constraints that: $\gamma_1 = \theta_1 = \rho_{1k} = \rho_{j1} = 0$, for all j, k . Controlling for the covariates in \mathbf{X}_{ijk} , a risk ratio for group j in cohort k (compared to the reference group, which is most commonly ancestral natives) is defined as: $IRR_{jk} = \exp(\gamma_j + \theta_k + \rho_{jk})$. In the main results, this risk ratio is used to make three comparisons: (i) a comparison of first generation migrant groups against ancestral natives, both from the 1922-1951 birth cohort, (ii) a comparison of second generation groups against ancestral natives, both from the 1952-1971 birth cohort, and (iii) a comparison of second generation groups from the 1952-1971 birth cohort against first generation migrants from the same ancestral group but the 1922-1951 birth cohort. In the second set of regression results, the same three comparisons are made, but conditional on covariates.

4.4.4 Assessing generational convergence

In order to assess convergence, the IRRs of the first and second generation are compared across their respective lagged birth cohorts. If the second generation IRR is closer to 1.0 (i.e. closer to natives) than the first generation IRR, then this suggests evidence of generational convergence. However, a further test is required to establish whether this evidence is significant. In order to summarize the results for every ancestry group, comparisons are therefore categorised as follows:

- **no initial difference (-)**: describes a result where the ratio between the first generation and second generation is equal to 1.0 (when rounded to one decimal place), therefore implying no initial difference
- **yes**: describes a result where convergence is evident because (a) the second generation has an IRR closer to 1.0 than the first generation, and (b) there is a statistically significant ratio, at the 5% level ($p < 0.05$), of second versus first generation IRRs, where each IRR is calculated versus ancestral natives from the same birth cohort as each generation
- **not significant (n.s.)**: is the same as 'yes', except that (b) is not significant at the 5% level
- **no**: describes a result where second generation fertility is further from the native norm, such that the first generation has an IRR closer to 1.0 than the second generation

For ease of generalization, 'yes' is considered to represent groups where there is evidence of generational convergence. However, despite these strictly defined categories, this research does not seek to over-interpret the accuracy of estimates. The 5% benchmark is somewhat arbitrary, and represents a fairly high type-one error. Similarly, results in the other categories may be inaccurate due to uncertainty. As the name suggests, results that are not significant suggest some possibility of convergence, which might be detected if a larger sample were available. The strongest evidence against convergence would be a

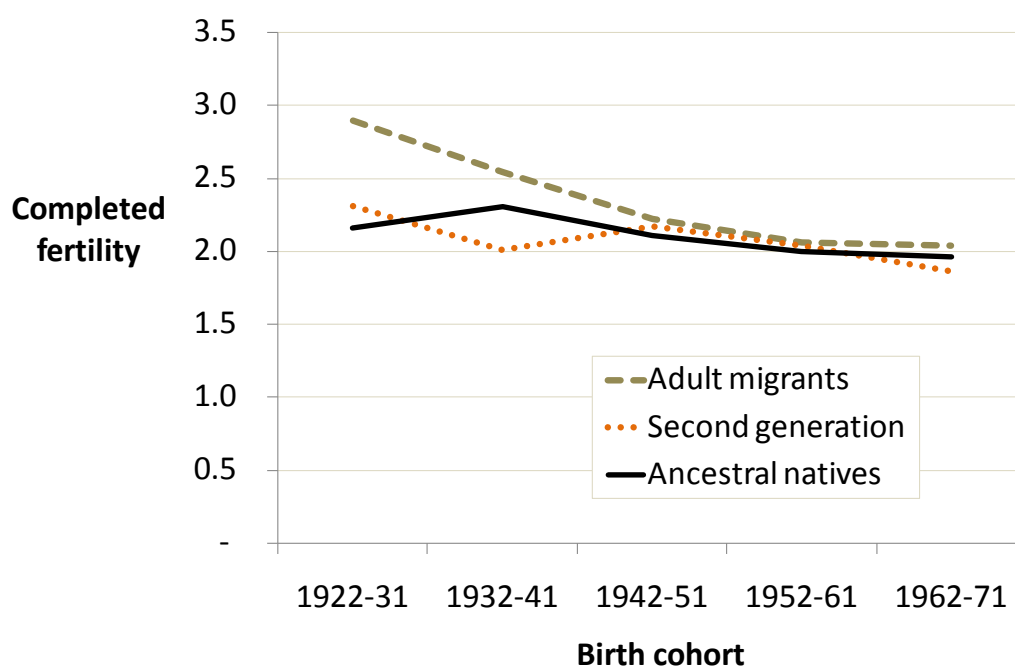
‘no’ with a statistically significant ratio, which describes a significant movement away from the native fertility norm.

In taking this approach, the aim is to enable a consistent, valid, and reliable comparison of different origin groups. Definitions are applied consistently, and the test of generational convergence has the same specification for each group, which aims to maximise the reliability of the approach. It is hoped that one contribution of this study is the use of a statistical comparison in order to evaluate generational fertility convergence.

4.5 Results

Before testing generational convergence by ancestry, figure 4.1 provides an overview of completed fertility trends for the first and second generation alongside ancestral natives. These results give some indication of aggregate patterns of convergence. There is a notable difference in completed fertility between adult migrants and ancestral natives for the oldest cohorts, as compared with the negligible difference between the second generation and ancestral natives for the cohorts born 20-30 years later.

Figure 4.1: Mean number of children (completed fertility), by birth cohort and generation



Source: UKHLS Wave 1 (author's analysis).

4.5.1 Analysis by origin and ancestry

The rest of the analysis disaggregates migrants by ancestry. The country of birth groups that are used are shown in appendix table A4.2 alongside their weighted distribution in the sample for each generation group. These groups were chosen in order to create ancestral groups with a similar migration history and a reasonable sample size. In addition, certain countries have been deliberately separated in this analysis, and this is largely based on the fact that their total period fertility rates are known to be different from the UK-born population (Coleman, 1994; Dubuc, 2012; Iliffe, 1978). Unfortunately, sample size limits this strategy to consideration of the largest populations.

The proportions shown in A4.2 are estimated using the UKHLS survey design (including weights). As expected, the results reflect historic patterns of immigration. But they also reflect emigration (including return migration), because the migrant population considered here are women who have

remained in the UK until 2009/10. There is limited research on the extent of this emigration, although for immigrants who arrived in the 1980s and 1990s, the percentage who emigrate (and leave the UK) within five years of arrival is around 40% (Rendall & Ball, 2004). It is important to note that this figure is an average, and return migration is substantially lower for immigrants from lower income origin countries. For example it is only 15% (within five years) for those from South Asia.

Having acknowledged that the sample proportions reflect patterns of emigration, the most notable difference between generations in table A4.2 is the higher proportion of second generation women from Ireland. It is also worth noting here, and for interpretation elsewhere, that the sample size for each cell in A4.2 is larger than 15, except for Bangladesh (where there are between 5 and 10 cases).

4.5.2 Comparisons with ancestral natives

Before comparing the migrant generations against each other, each generation is compared against the ancestral native average for the same birth cohort. An overview of comparative fertility patterns is therefore provided by looking at the estimated IRRs for the two generation/cohort groups (see table 4.2). For example, adult migrant women from Ireland born between 1922 and 1951 have completed fertility that is 30% higher than ancestral natives (IRR=1.3, $p=0.03$). Without any comparison across generations, it is apparent that completed fertility is persistently higher for Pakistanis and Bangladeshis, a result which suggests cultural entrenchment. Also notable, is the higher fertility, relative to ancestral natives, for first generation Jamaicans, and the lower fertility for second generation women from North Africa and the Middle East.

Table 4.2: Convergence across generations: by ancestry

Ancestry	1922-1951 cohorts		1952-1971 cohorts		comparison: across generations			
	1st gen IRR (vs natives)	p-value	2nd gen IRR (vs natives)	p-value	Which is closer to native norm?	ratio: 2nd / 1st	p-value	convergence?
Ireland	1.3	0.03	1.0	0.81	2nd	0.8	0.04	yes
India	1.2	0.13	1.1	0.50	2nd	0.9	0.49	n.s.
Pakistan	1.7	0.00	1.5	0.00	2nd	0.9	0.58	n.s.
Bangladesh	1.5	0.07	1.4	0.07	2nd	0.9	0.77	n.s.
Jamaica	1.6	0.00	0.9	0.14	2nd	0.5	0.00	yes
Other Caribbean	1.1	0.43	0.9	0.36	2nd	0.8	0.25	n.s.
NZ, Australia, US & Canada	0.9	0.27	1.0	0.91	2nd	1.2	0.42	n.s.
N. & W. Europe	1.0	0.74	0.9	0.51	1st	0.9	0.50	-
S. & E. Europe	1.0	0.97	0.9	0.21	1st	0.9	0.49	-
N. Africa & Middle East	0.9	0.41	0.7	0.03	1st	0.8	0.34	no
W. & C. Africa	1.0	0.97	1.1	0.29	1st	1.1	0.50	-
E. & S. Africa	1.0	0.61	1.0	0.92	2nd	0.9	0.70	-
East Asia	0.8	0.41	0.9	0.67	2nd	1.1	0.62	n.s.
Other	0.9	0.76	1.0	0.81	2nd	1.1	0.70	n.s.

Notes: Models are estimated accounting for survey design. Each IRR shows the risk of birth relative to ancestral natives in that birth cohort, where an IRR of 1.0 means that women had the same completed fertility as ancestral natives. The ratio shows second generation IRRs divided by first generation IRRs. Hence, a value larger than 1.0 suggests higher fertility, relative to natives, for the second generation compared with the first. Convergence is assessed consistently using the following rules: ‘yes’ describes a movement toward native completed fertility (i.e. toward an IRR of 1.0) which is statistically significant at the 5% level ($p < 0.05$); ‘n.s.’ describes a movement toward native completed fertility which is not statistically significant at the 5% level; ‘no’ describes any movement away from native completed fertility, ‘-’ describes any situation where there is no initial difference between the first and second generation as evidenced by a first generation IRR equal to 1.0; Source: UKHLS Wave 1 (author’s analysis).

4.5.3 Evidence of convergence for different migrant groups

Comparing different groups, there is statistically significant evidence of generational convergence for women with Irish and Jamaican ancestries (table 4.2). In addition to a significant comparison between generations, these ancestral groups show no significant difference between the second generation and ancestral natives. As such, Irish and Jamaican fertility could also be judged to have fully converged. When considered alongside the fact that first generation fertility is significantly different from the native norm, this is also evidence in support of the childhood socialisation hypothesis (table 4.3).

There is non-significant evidence of convergence for all South Asian groups, but convergence patterns are very different for Indians compared with Pakistanis and Bangladeshis. The completed fertility of Indian women is not significantly different from natives, for either generation. As such, the results for Indian women might be indicative of adaptation, but even if this is not the case, it is clear that the IRRs for Indians are much smaller than for other South Asians. On the other hand, there is evidence of cultural entrenchment for Pakistani and Bangladeshi migrants, who have IRRs that are significantly higher than natives for both the first and second generation (although only at the 10% level for Bangladeshis, for whom the sample size is relatively small). At a minimum, these results demonstrate that South Asian migrants in the UK do not exhibit a homogenous pattern of generational convergence.

The remaining ancestry groups are either classed as having no initial difference, non-significant evidence, or evidence of no convergence. For those classed as non-significant, it would seem important to differentiate between those groups where first generation completed fertility is higher than natives (e.g. South Asians), and those for whom it is lower (e.g. East Asians).

Only one group shows evidence of no convergence. For the descendants of immigrants from North Africa and the Middle East, their fertility is diverging from the native norm. According to the definitions of this

study, they also show evidence of cultural entrenchment, although this interpretation assumes that they have a culturally entrenched norm for lower fertility than the UK norm. Given that fertility is on average higher in these regions than the UK (UN, 2013), this suggests that a different explanation for this result may be more plausible.

Table 4.3: Confirmation of migrant fertility hypotheses with specific predictions for both the first and second generation

Ancestry	Is there evidence in support of the hypothesis?	
	childhood socialisation	cultural entrenchment
Ireland	yes	
India		
Pakistan		yes
Bangladesh		yes (p<0.1)
Jamaica	yes	
Other Caribbean		
NZ, Australia, US & Canada		
N. & W. Europe		
S. & E. Europe		
N. Africa & Middle East		yes
W. & C. Africa		
E. & S. Africa		
East Asia		
Other		

Notes: Based on results shown in table 4.2. Hypotheses are tested using a guideline significance level of 5% ($p < 0.05$), where the predictions of each hypothesis are as follows: The childhood socialisation hypothesis predicts a significant difference between the fertility of ancestral natives and first generation migrants, but no significant difference between the fertility of ancestral natives and the second generation. The cultural entrenchment hypothesis predicts a significant difference between the fertility of ancestral natives and the second generation. Models are estimated accounting for survey design. Source: UKHLS Wave 1 (author's analysis).

4.5.4 Social characteristics

The main aim of this paper is to explore evidence for generational convergence in the UK and how it varies by origin group. Having done this, one pertinent consideration is whether the results discussed above can be explained by the population composition of the groups being compared. As mentioned above, this explanation has a long history in the literature under the guise of the *social*

characteristics hypothesis (Forste & Tienda, 1996; Goldscheider & Uhlenberg, 1969). Recent research on the UK has suggested that the average fertility of UK natives might not be the most appropriate reference group for comparisons of convergence, in particular when considering variations in cultural and social influences within the UK (Dubuc, 2012). One alternative is to compare with natives who have similar characteristics.

There is neither the space, nor the data, to study all the characteristics here that may explain convergence. Instead, education and partnership history are considered as an example of how this analysis can be extended to explore social characteristics. It is important to emphasise that the aim is not to try and isolate the true effect of ancestry (net of other characteristics), as this would raise a number of methodological issues, not least those relating to the fact that education, partnership, and fertility are all simultaneous processes. Instead, the aim is to investigate how the results change when the comparison group is changed to individuals with the same characteristics, (a somewhat similar approach to that of standardisation). As well as affecting the comparison of the first and second generation, this affects the comparison of these migrant generations with natives. For example, the addition of education and partnership controls means that Irish adult migrants are effectively compared with natives who have the same education and partnership history.

Appendix table A4.3 displays the results after adding controls to the models shown earlier (in table 4.2). For the most part, there are no material changes to the results. For example, the IRR for first generation Jamaican women born between 1922 and 1951 is 5% higher after adding controls, but this only represents an increase from an IRR of 1.6 to 1.7. Furthermore, the new analysis does not change the qualitative inferences made about convergence for this group. In fact, only very few of the inferences discussed earlier are changed by the addition of controls. The most material changes are that the conclusion for Irish migrant convergence changes from significant to non-significant evidence of convergence, although this is entirely driven by a change in the p-

value of the comparison of Irish generations from 0.04 to 0.06. In addition, there is now some evidence of childhood socialisation for Indians because completed fertility for the first generation is now significantly higher than the native norm. Finally, the only other material change is for women from Western and Central Africa, who now show evidence of cultural entrenchment due to a significantly higher completed fertility than natives for the second generation. The significance of this finding suggests that second generation women with Western and Central African ancestry may differ markedly, on average, from natives in terms of their education and partnership, and that these social characteristics may be an important explanation for their fertility.

4.6 Conclusion

As argued elsewhere, assimilation is linked with ancestral origins to such an extent that assimilation processes can only be elucidated through a consideration of migrant heterogeneity (Alba & Nee 2005; Crul & Vermeulen 2003; Portes & Rumbaut 2001; Rumbaut & Portes 2001; Yinger 1981). By examining this heterogeneity with respect to the intergenerational assimilation of completed fertility, this analysis shows how different migrant groups are likely to contribute to population growth in the long-run via their fertility. In addition, it demonstrates variation in generational convergence that can be the starting point for future research that looks to explain intergenerational assimilation.

This paper therefore set out to investigate assimilation theory by testing generational fertility convergence in the UK and examining how this varies for different ancestral origin groups. The results show that convergence patterns vary considerably. It seems impossible to summarise evidence for and against intergenerational assimilation without specifying which migrant group is being discussed, (at least in the UK). Although there is some non-significant evidence of generational convergence for a number of ancestries, there was only significant evidence for two groups: Irish and Jamaicans. These are also the only

groups who show evidence of childhood socialisation, which suggests that second generation Irish and Jamaicans may be adopting native fertility norms because they spend their childhood in the UK. This evidence for childhood socialisation aligns with previous results for the UK which shows that child migrants have more similar fertility to natives if they arrive in England and Wales at younger ages (Adserà et al., 2012).

In contrast to this evidence of childhood socialisation, there is evidence of cultural entrenchment for the descendants of immigrants from Pakistan and Bangladesh. For these origins, the second generation have higher completed fertility than the native norm, suggesting that fertility differentials persist across generations. This result may appear to be in contrast to conclusions made elsewhere using a different methodology (Dubuc, 2012). However, both studies indicate a sustained difference between the native norm and second generation fertility for Pakistanis and Bangladeshis, and both studies also find a smaller differential for the second generation as compared with the first. The difference between this study and Dubuc's is that here convergence is not judged to have occurred because second generation fertility differentials are not significantly different from differentials for the first generation.

It is tempting to attribute these results for South Asian origins to the higher rates of marriage and younger ages at marriage for these ancestry groups (Coleman, Compton, & Salt, 2002). However, qualitative conclusions remained unchanged when the analysis incorporates partnership history. Although this is not strong enough evidence to dismiss this explanation entirely, it certainly suggests the need for further research that considers explanations for this entrenchment. In particular, it may be that the fertility of second generation Pakistanis and Bangladeshi is explained by exposure to cultural norms. This may be linked to other intergenerational assimilation processes. For example, it may be that the cultural entrenchment of Pakistani fertility in the UK relates to language assimilation or residential segregation.

Other findings that might be investigated by further research include the results for women from North Africa and the Middle East. Although there is no significant differential for the first generation, second generation women from these regions have significantly lower completed fertility than ancestral natives. The analysis of social characteristics suggests that this is unrelated to partnership or education, but it may reflect other characteristics, alongside changes in fertility norms across North Africa and the Middle East (e.g. Abbasi-Shavazi & McDonald, 2006). This can be contrasted with the finding that second generation women with Western or Central African ancestry have significantly different fertility from natives after controlling for their education and partnership history. For these women, it may be valuable for research to investigate the relationship between their social characteristics and their fertility.

There are several reasons why the results shown here should be treated with caution. The sample includes only those women who were resident in UK households between 2009 and 2011, which means that it excludes women who have died or emigrated before these dates. This makes it difficult to generalise the findings backwards in time because migrants who were previously UK-residents are not included if they have returned to their origin country (or emigrated elsewhere or died). Research on Swedish data suggests that mortality and migration may make little difference to aggregate estimates of fertility in general, but that they may have more of an influence when comparing migrants with the native population (Andersson & Sobolev, 2013). Any conclusions and generalisations must be tempered by this consideration.

Another important caveat is that the results shown here are subject to uncertainty in a number of ways, not least the chosen significance thresholds which were used to help communicate the findings. Given that much of the uncertainty in the results can be attributed to sample size, especially for small groups like Bangladeshis, it is recommended that future data collection includes an effort to make available larger samples.

Despite the above limitations, the benefits of this study are demonstrated by the clarity of its results. It is clear that the long-run contribution to population growth via fertility is very different for the descendants of immigrants from Ireland and Jamaica, as opposed to those from Pakistan and Bangladesh. Intergenerational assimilation does not occur equally for different ancestral origin groups, at least not for completed fertility in the UK. The combination of a statistical test of generational convergence, with a comparison of ancestral groups, allows different patterns of convergence to be distinguished. Then, within the limits of this descriptive study, these patterns can be attributed to hypothetical explanations like childhood socialisation and cultural entrenchment. Importantly, they also provide guidance for future research, highlighting those groups that warrant further investigation.

References

- Abbasi-Shavazi, M. J., & McDonald, P. (2000). Fertility and multiculturalism: Immigrant fertility in Australia, 1977-1991. *International Migration Review*, 34(1), 215-242.
- Abbasi-Shavazi, M. J., & McDonald, P. (2006). Fertility Decline in the Islamic Republic of Iran: 1972-2000. *Asian Population Studies*, 2(3), 217-237.
<http://doi.org/10.1080/17441730601073789>
- Adserà, A., Ferrer, A. M., Sigle-Rushton, W., & Wilson, B. (2012). Fertility Patterns of Child Migrants Age at Migration and Ancestry in Comparative Perspective. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 160-189.
<http://doi.org/10.1177/0002716212444706>
- Agresti, A. (2002). *Categorical data analysis*. New York: Wiley-Interscience.
- Alba, R., & Nee, V. (1997). Rethinking Assimilation Theory for a New Era of Immigration. *International Migration Review*, 31(4), 826-874. <http://doi.org/10.2307/2547416>
- Alba, R., & Nee, V. (2005). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Andersson, G., & Sobolev, B. (2013). Small Effects of Selective Migration and Selective Survival in Retrospective Studies of Fertility. *European Journal of Population / Revue Européenne de Démographie*, 29(3), 345-354. <http://doi.org/10.1007/s10680-013-9293-6>
- Bean, F. D., Swicegood, C. G., & Berg, R. (2000). Mexican-Origin Fertility: New Patterns and Interpretations. *Social Science Quarterly (University of Texas Press)*, 81(1), 404-420.
- Beaujot, R. (2002). Effect of immigration on demographic structure. *PSC Discussion Papers Series*, 16(9), 1.
- Bélanger, A., & Gilbert, S. (2006). The fertility of immigrant women and their Canadian-born daughters. In *Report on the Demographic Situation in Canada, 2002* (pp. 127-151). Statistics Canada.
- Berry, J. W. (1997). Immigration, Acculturation, and Adaptation. *Applied Psychology*, 46(1), 5-34.
<http://doi.org/10.1111/j.1464-0597.1997.tb01087.x>
- Berry, J. W. (2005). Acculturation: Living successfully in two cultures. *International Journal of Intercultural Relations*, 29(6), 697-712. <http://doi.org/10.1016/j.ijintrel.2005.07.013>
- Bouvier, L. F., & Gardner, R. W. (1986). Immigration to the U.S.: The Unfinished Story. *Population Bulletin*, 41(4).
- Brubaker, R. (2001). The return of assimilation? Changing perspectives on immigration and its sequels in France, Germany, and the United States. *Ethnic and Racial Studies*, 24(4), 531-548. <http://doi.org/10.1080/01419870120049770>
- Buck, N., & McFall, S. (2011). Understanding Society: design overview. *Longitudinal and Life Course Studies*, 3(1), 5 - 17.
- Carter, M. (2000). Fertility of Mexican Immigrant Women in the U.S.: A Closer Look. *Social Science Quarterly (University of Texas Press)*, 81(4), 1073-1086.
- Coleman, D. A. (1994). Trends in fertility and intermarriage among immigrant populations in Western Europe as measures of integration. *Journal of Biosocial Science*, 26(01), 107-136.
- Coleman, D. A. (2002). Replacement migration, or why everyone is going to have to live in Korea: a fable for our times from the United Nations. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 357(1420), 583-598.
<http://doi.org/10.1098/rstb.2001.1034>

- Coleman, D. A. (2006). Immigration and Ethnic Change in Low-Fertility Countries: A Third Demographic Transition. *Population and Development Review*, 32(3), 401–446.
- Coleman, D. A. (2009). The demographic effects of international migration in Europe. *Oxford Review of Economic Policy*, 24(3), 452–476. <http://doi.org/10.1093/oxrep/grn027>
- Coleman, D. A., Compton, P., & Salt, J. (2002). Demography of migrant populations: the case of the United Kingdom. In W. Haug, P. Compton, & Y. Courbage (Eds.), *The demographic characteristics of immigrant populations* (p. 497). Council of Europe Publishing.
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64(1), 19–41. <http://doi.org/10.1080/00324720903391201>
- Crul, M., & Doornik, J. (2003). The Turkish and Moroccan Second Generation in the Netherlands: Divergent Trends between and Polarization within the Two Groups. *International Migration Review*, 37(4), 1039–1064. <http://doi.org/10.1111/j.1747-7379.2003.tb00169.x>
- Crul, M., & Vermeulen, H. (2003). The Second Generation in Europe. *International Migration Review*, 37(4), 965–986. <http://doi.org/10.1111/j.1747-7379.2003.tb00166.x>
- Dubuc, S. (2009). Application of the Own-Children Method for estimating fertility by ethnic and religious groups in the UK. *Journal of Population Research*, 26(3), 207–225. <http://doi.org/10.1007/s12546-009-9020-7>
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>
- Dubuc, S., & Haskey, J. (2010). Ethnicity and Fertility in the United Kingdom. In J. Stillwell & M. Ham (Eds.), *Ethnicity and Integration* (pp. 63–81). Dordrecht: Springer Netherlands. Retrieved from <http://www.springerlink.com.gate2.library.lse.ac.uk/content/x75262030127783t/>
- Easton, M. (2011, June 17). Britain's mysterious baby boom. *BBC*. Retrieved from <http://www.bbc.co.uk/news/uk-13809280>
- Easton, M. (2012, July 16). What is the UK's optimum population? *BBC*. Retrieved from <http://www.bbc.co.uk/news/uk-18854762>
- Easton, M. (2013). More UK births than any year since 1972, says ONS. *BBC News*. Retrieved from <http://www.bbc.co.uk/news/uk-23618487>
- Edmonston, B. (2010). The Contribution of Immigration to Population Growth. In T. Salzman, B. Edmonston, & J. Raymer (Eds.), *Demographic Aspects of Migration* (pp. 29–72). VS Verlag für Sozialwissenschaften. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-531-92563-9_2
- European Commission. (2011). Migrants in Europe: A statistical portrait of the first and second generation. *Luxembourg: Publications Office of the European Union*.
- Feld, S. (2000). Active Population Growth and Immigration Hypotheses in Western Europe. *European Journal of Population / Revue Européenne de Démographie*, 16(1), 3–39. <http://doi.org/10.1023/A:1006331030823>
- Forste, R., & Tienda, M. (1996). What's Behind Racial and Ethnic Fertility Differentials? *Population and Development Review*, 22, 109–133. <http://doi.org/10.2307/2808008>
- Frank, R., & Heuveline, P. (2005). A cross-over in Mexican and Mexican-American fertility rates. *Demographic Research*, 12, 77–104. <http://doi.org/10.4054/DemRes.2005.12.4>
- Friedlander, D., & Goldscheider, C. (1978). Immigration, Social Change and Cohort Fertility in Israel. *Population Studies*, 32(2), 299–317. <http://doi.org/10.2307/2173563>
- Geddes, A. (2003). *The Politics of migration and immigration in Europe*. London: SAGE.

- Gibson, C. (1992). The Contribution of Immigration to the Growth and Ethnic Diversity of the American Population. *Proceedings of the American Philosophical Society*, 136(2), 157-175.
- Glazer, N. (1993). Is assimilation dead? *The Annals of the American Academy of Political and Social Science*, 530(1), 122-136.
- Goldberg, D. (1959). The Fertility of Two-Generation Urbanites. *Population Studies*, 12(3), 214-222. <http://doi.org/10.2307/2171971>
- Goldberg, D. (1960). Another Look at the Indianapolis Fertility Data. *The Milbank Memorial Fund Quarterly*, 38(1), 23-36. <http://doi.org/10.2307/3348618>
- Goldscheider, C. (1965). Nativity, Generation and Jewish Fertility. *Sociological Analysis*, 26(3), 137-147. <http://doi.org/10.2307/3710101>
- Goldscheider, C. (1967). Fertility of the jews. *Demography*, 4(1), 196-209. <http://doi.org/10.2307/2060361>
- Goldscheider, C., & Uhlenberg, P. R. (1969). Minority Group Status and Fertility. *American Journal of Sociology*, 74(4), 361-372.
- Goldstein, S., & Goldscheider, C. (1968). Jewish Americans. Three Generations in a Jewish Community. Retrieved from <http://eric.ed.gov/?id=ED061394>
- Goldstein, S., & Goldstein, A. (1981). The Impact of Migration on Fertility: an 'Own Children' Analysis for Thailand. *Population Studies*, 35(2), 265-284. <http://doi.org/10.2307/2174939>
- Goldstein, S., & Goldstein, A. (1983). Migration and Fertility in Peninsular Malaysia. A Rand Note, Prepared for The Agency for International Development, [N-1860-AID]. Retrieved from <http://www.rand.org/pubs/notes/N1860.html>
- Gordon, M. M. (1964). *Assimilation in American life: The role of race, religion, and national origins*. Oxford University Press, USA.
- Harbison, S. F., & Weishaar, M. (1981). Samoan Migrant Fertility: Adaptation and Selection. *Human Organization*, 40(3), 268-273.
- Hatton, T. J., & Williamson, J. G. (2005). *Global migration and the world economy: two centuries of policy and performance*. Cambridge, Mass.: MIT Press.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.
- Heath, A. F., Rethon, C., & Kilpi, E. (2008). The Second Generation in Western Europe: Education, Unemployment, and Occupational Attainment. *Annual Review of Sociology*, 34(1), 211-235. <http://doi.org/10.1146/annurev.soc.34.040507.134728>
- Hervitz, H. M. (1985). Selectivity, adaptation, or disruption? A comparison of alternative hypotheses on the effects of migration on fertility: The case of Brazil. *International Migration Review*, 19(2), 293-317.
- Hill, J. A. (1913). Comparative Fecundity of Women of Native and Foreign Parentage in the United States. *Publications of the American Statistical Association*, 13(104), 583-604. <http://doi.org/10.2307/2965013>
- Hill, L. E., & Johnson, H. P. (2004). Fertility Changes Among Immigrants: Generations, Neighborhoods, and Personal Characteristics. *Social Science Quarterly*, 85(3), 811-827. <http://doi.org/10.1111/j.0038-4941.2004.00246.x>
- Hirschman, C. (2005). Immigration and the American century. *Demography*, 42(4), 595-620. <http://doi.org/10.1353/dem.2005.0031>

- Hirschman, C. (2006). The impact of immigration on American society: Looking backward to the future. *Border Battles: The US Immigration Debates*. Retrieved from http://faculty.washington.edu/charles/pubs/Immigration_and_Future.pdf
- Iliffe, L. (1978). Estimated fertility rates of Asian and West Indian immigrant women in Britain, 1969-74. *Journal of Biosocial Science*, 10(02), 189-197.
- Jonsson, S. H., & Rendall, M. S. (2004). The Fertility Contribution of Mexican Immigration to the United States. *Demography*, 41(1), 129-150.
- Koehler, J., Laczko, F., Aghazarm, C., & Schad, J. (2010). Migration and the economic crisis in the European Union: implications for policies. *IOM (Brussels: IOM, 2010)*, 1-205.
- Kulu, H. (2005). Migration and Fertility: Competing Hypotheses Re-examined. *European Journal of Population / Revue Européenne de Démographie*, 21(1), 51-87. <http://doi.org/10.1007/s10680-005-3581-8>
- Kulu, H., & González-Ferrer, A. (2014). Family Dynamics Among Immigrants and Their Descendants in Europe: Current Research and Opportunities. *European Journal of Population*, 30(4), 411-435. <http://doi.org/10.1007/s10680-014-9322-0>
- Landale, N. S., & Hauan, S. M. (1996). Migration and premarital childbearing among Puerto Rican women. *Demography*, 33(4), 429-442. <http://doi.org/10.2307/2061778>
- Livi Bacci, M. (2012). *A short history of migration ; translated by Carl Ipsen*. Cambridge, UK; Malden, MA: Polity Press.
- Mannheim, K. (1952). The Sociological Problem of Generations. In *Essays on the Sociology of Knowledge* (pp. 304-307). Retrieved from http://mediaspace.newmuseum.org/ytjpressmaterials/PDFS/ARTICLES_ABOUT_THE_GENERATION/01_The_Sociological_Problem.pdf
- Massey, D. S. (1981). Dimensions of the New Immigration to the United States and the Prospects for Assimilation. *Annual Review of Sociology*, 7, 57-85. <http://doi.org/10.1146/annurev.so.07.080181.000421>
- Massey, D. S. (1999). International Migration at the Dawn of the Twenty-First Century: The Role of the State. *Population and Development Review*, 25(2), 303-322. <http://doi.org/10.1111/j.1728-4457.1999.00303.x>
- Massey, D. S. (2005). *Worlds in Motion: Understanding International Migration at the End of the Millennium* (OUP Catalogue). Oxford University Press. Retrieved from <http://ideas.repec.org/b/oxp/obooks/9780199282760.html>
- Massey, D. S., Durand, J., & Malone, N. J. (2003). *Beyond smoke and mirrors: Mexican immigration in an era of economic integration*. Russell Sage Foundation.
- Mayer, J., & Riphahn, R. T. (2000). Fertility assimilation of immigrants: Evidence from count data models. *Journal of Population Economics*, 13(2), 241-261.
- Milewski, N. (2010). *Fertility of immigrants: a two-generational approach in Germany*. Springer Berlin Heidelberg. Retrieved from http://link.springer.com.gate2.library.lse.ac.uk/chapter/10.1007/978-3-642-03705-4_1
- Murphy, M. (2009). Where have all the children gone? Women's reports of more childlessness at older ages than when they were younger in a large-scale continuous household survey in Britain. *Population Studies*, 63(2), 115-133. <http://doi.org/10.1080/00324720902917238>
- Nannestad, P. (2007). Immigration and welfare states: A survey of 15 years of research. *European Journal of Political Economy*, 23(2), 512-532. <http://doi.org/10.1016/j.ejpoleco.2006.08.007>

- Ní Bhrolcháin, M., Beaujouan, É., & Murphy, M. (2011). Sources of error in reported childlessness in a continuous British household survey. *Population Studies*, 65(3), 305–318. <http://doi.org/10.1080/00324728.2011.607901>
- ONS. (2012a). *International migrants in England and Wales, 2011*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_290335.pdf
- ONS. (2012b). *Migration Statistics Quarterly Report - February 2012*. ONS (online). Retrieved from http://www.ons.gov.uk/ons/dcp171778_256050.pdf
- ONS. (2012c). *Population by Country of Birth and Nationality Report*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_277619.pdf
- Park, R. E., & Burgess, E. W. (1921). *Introduction to the Science of Sociology*. Chicago: University of Chicago Press.
- Parrado, E. A. (2011). How High is Hispanic/Mexican Fertility in the United States? Immigration and Tempo Considerations. *Demography*, 48(3), 1059–1080. <http://doi.org/10.1007/s13524-011-0045-0>
- Parrado, E. A., & Morgan, S. P. (2008). Intergenerational Fertility Among Hispanic Women: New Evidence of Immigrant Assimilation. *Demography*, 45(3), 651–671.
- Picot, W. G. (2008). *Immigrant economic and social outcomes in Canada: research and data development at Statistics Canada*. [Ottawa]: Business and Labour Market Analysis Division, Statistics Canada.
- Portes, A., Fernández-Kelly, P., & Haller, W. (2005). Segmented assimilation on the ground: The new second generation in early adulthood. *Ethnic and Racial Studies*, 28(6), 1000–1040. <http://doi.org/10.1080/01419870500224117>
- Portes, A., & Rumbaut, R. G. (2001). *Legacies: the story of the immigrant second generation*. Berkeley; New York: University of California Press ; Russell Sage Foundation.
- Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The Annals of the American Academy of Political and Social Science*, 530(1), 74–96.
- Rendall, M. S., & Salt, J. (2005). The foreign-born population. *Focus on People and Migration*, London: Palgrave Macmillan, 131–152.
- Ritchey, P. N. (1975). The Effect of Minority Group Status on Fertility: A Re-examination of Concepts. *Population Studies*, 29(2), 249–257. <http://doi.org/10.2307/2173510>
- Robards, J. (2012, June). *Estimating the fertility of recent migrants to England and Wales (1991-2001) – is there an elevated level of fertility after migration?* Presented at the European Population Conference, Stockholm University.
- Robards, J., Berrington, A., & Hinde, A. (2011). Estimating fertility rates using the ONS Longitudinal Study-what difference does the inclusion of non-continually resident members make? *Population Trends*, 144.
- Rosenwaike, I. (1973). Two generations of Italians in America: their fertility experience. *International Migration Review*, 7(3), 271–280.
- Rudmin, F. W. (2003). Critical history of the acculturation psychology of assimilation, separation, integration, and marginalization. *Review of General Psychology*, 7(1), 3–37. <http://doi.org/10.1037/1089-2680.7.1.3>
- Rumbaut, R. G., & Portes, A. (Eds.). (2001). *Ethnicities: children of immigrants in America*. Berkeley [u.a.]: Univ. of California Press.
- Schwartz, S. J., Unger, J. B., Zamboanga, B. L., & Szapocznik, J. (2010). Rethinking the concept of acculturation: Implications for theory and research. *American Psychologist*, 65(4), 237.

- Sigle-Rushton, W. (2008). England and Wales: Stable fertility and pronounced social status differences. *Demographic Research*, 19(15), 455–502.
- Simon, P. (2003). France and the Unknown Second Generation: Preliminary Results on Social Mobility. *International Migration Review*, 37(4), 1091–1119.
<http://doi.org/10.1111/j.1747-7379.2003.tb00171.x>
- Smith, J. P. (2003). Assimilation across the Latino Generations. *The American Economic Review*, 93(2), 315–319.
- Smith, J. P. (2006). Immigrants and the Labor Market. *Journal of Labor Economics*, 24(2), 203–233.
<http://doi.org/10.1086/jole.2006.24.issue-2>
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225–248. <http://doi.org/10.4054/DemRes.2008.19.9>
- StataCorp. (2009). *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP.
- Statistics Canada. (2006). *Report on the Demographic Situation in Canada, 2002* (pp. 127–151). Statistics Canada.
- Stephen, E. H. (1989). *At the Crossroads: Fertility of Mexican-American Women*. New York: Garland Science.
- Stephen, E. H., & Bean, F. D. (1992). Assimilation, Disruption and the Fertility of Mexican-Origin Women in the United States. *International Migration Review*, 26(1), 67–88.
<http://doi.org/10.2307/2546937>
- Swicegood, G., & Morgan, S. P. (2002). Racial and Ethnic Fertility Differentials in the United States. In N. A. Denton & S. E. Tolnay (Eds.), *American Diversity: A Demographic Challenge for the Twenty-first Century* (pp. 99–107). SUNY Press.
- Thomson, M., & Crul, M. (2007). The Second Generation in Europe and the United States: How is the Transatlantic Debate Relevant for Further Research on the European Second Generation? *Journal of Ethnic and Migration Studies*, 33(7), 1025–1041.
<http://doi.org/10.1080/13691830701541556>
- Toulemon, L. (2004). Fertility among immigrant women: new data, a new approach. *Population & Societies*, 400. Retrieved from
http://www.ined.fr/en/publications/pop_soc/bdd/publication/540/
- Toulemon, L. (2006). *Fertility Among Immigrant Women in France: New Data, a New Approach*. Prepared for Population Association of American 2006 Annual Meeting, Los Angeles, California, March 30–April 1, 2006.
- Toulemon, L., & Mazuy, M. (2004). *Comment prendre en compte l'âge à l'arrivée et la durée de séjour en France dans la mesure de la fécondité des immigrants?* INED. Retrieved from
http://www.ined.fr/fichier/t_publication/1053/publi_pdf1_120.pdf
- Uhlenberg, P. (1973). Fertility patterns within the Mexican-American population. *Biodemography and Social Biology*, 20(1), 30–39. <http://doi.org/10.1080/19485565.1973.9988020>
- UN. (2000). *Replacement Migration: Is it a Solution to Declining and Ageing Populations?*. Population Division, Department of Economic and Social Affairs, United Nations Secretariat.
- UN. (2013). *World Population Prospects: The 2012 Revision*. New York: United Nations Population Division. Retrieved from <http://esa.un.org/wpp>
- Vermeulen, H. (2010). Segmented assimilation and cross-national comparative research on the integration of immigrants and their children. *Ethnic and Racial Studies*, 33(7), 1214–1230.
<http://doi.org/10.1080/01419871003615306>
- Voas, D. (2009). The Maintenance and Transformation of Ethnicity: Evidence on Mixed Partnerships in Britain. *Journal of Ethnic and Migration Studies*, 35(9), 1497–1513.
<http://doi.org/10.1080/13691830903125943>

- Walvin, J. (1984). *Passage to Britain: immigration in British history and politics*. Penguin in association with Belitha Press.
- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31(1), 105–125.
<http://doi.org/10.1146/annurev.soc.29.010202.100026>
- Wilson, B. (2011, August 19). *Migrant fertility in England and Wales: Measuring fertility convergence* (Masters dissertation). London School of Economics and Political Science, London.
- Worbs, S. (2003). The Second Generation in Germany: Between School and Labor Market1. *International Migration Review*, 37(4), 1011–1038. <http://doi.org/10.1111/j.1747-7379.2003.tb00168.x>
- Yinger, J. M. (1981). Toward a theory of assimilation and dissimilation. *Ethnic and Racial Studies*, 4(3), 249–264. <http://doi.org/10.1080/01419870.1981.9993338>
- Young, C. M. (1991). Changes in the Demographic Behaviour of Migrants in Australia and the Transition between Generations. *Population Studies*, 45(1), 67–89.
- Zarate, A., & Zarate, A. U. de. (1975). On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. *International Migration Review*, 9(2), 115–156.
- Zhou, M. (1997). Segmented Assimilation: Issues, Controversies, and Recent Research on the New Second Generation. *International Migration Review*, 31(4), 975–1008.
<http://doi.org/10.2307/2547421>
- Zumpe, J., Dormon, O., & Jefferies, J. (2012). *Childbearing among UK born and non-UK born women living in the UK*. ONS. Retrieved from
http://www.ons.gov.uk/ons/dcp171766_283876.pdf

Appendix tables

TABLE A4.1: THE ANALYTICAL SAMPLE

	Frequency (n)	Percentage of women aged 40+	Percentage of eligible sample
Women aged 40+	16,332		
born before 1922	190	1.2	
proxy respondent	507	3.1	
child migrant	349	2.1	
foreign-born with one or more UK parents	234	1.4	
Eligible sample	15,052	92.2	
missing country of birth	4		<0.1
missing age at migration	18		0.1
missing parental country of birth	126		0.8
different parental country of birth	63		0.4
missing covariates	174		1.2
missing fertility history	417		2.8
Analytical sample	14,250		94.7

Source: UKHLS Wave 1 (author's analysis).

TABLE A4.2: PERCENTAGE OF NON-NATIVES IN EACH GENERATION AND COHORT GROUP: BY ANCESTRY

	1922-1951	1952-1971
Ancestry	1st generation	2nd generation
Ireland	16	37
India	12	10
Pakistan	3	3
Bangladesh	1	0
Jamaica	5	7
Other Caribbean	4	4
NZ, Australia, US & Canada	6	5
North & West Europe	14	9
South & East Europe	12	13
North Africa & Middle East	5	3
West & Central Africa	3	2
East & Southern Africa	8	2
East Asia	4	2
Other	7	2
total (%)	100	100

Note: Percentages are weighted accounting for survey design so that results are representative of the UK population. Results as shown may not sum correctly due to rounding; Source: UKHLS Wave 1 (author's analysis).

TABLE A4.3: CONVERGENCE ACROSS GENERATIONS: INCLUDING COVARIATES

Ancestry	1922-1951 cohorts		1952-1971 cohorts		comparison: across generations			
	1st gen IRR (vs natives)	p-value	2nd gen IRR (vs natives)	p-value	Which is closer to native norm?	ratio: 2nd / 1st	p-value	convergence?
Ireland	1.3	0.03	1.0	0.38	2nd	0.8	0.06	n.s.
India	1.2	0.04	1.1	0.24	2nd	0.9	0.41	n.s.
Pakistan	1.7	0.00	1.5	0.00	2nd	0.9	0.44	n.s.
Bangladesh	1.4	0.08	1.4	0.02	2nd	1.0	0.94	n.s.
Jamaica	1.7	0.00	1.1	0.20	2nd	0.7	0.00	yes
Other Caribbean	1.2	0.17	1.2	0.19	2nd	1.0	0.84	n.s.
NZ, Australia, US & Canada	1.0	0.80	1.0	0.96	2nd	1.0	0.81	-
N. & W. Europe	1.1	0.53	1.0	0.99	2nd	0.9	0.62	n.s.
S. & E. Europe	1.0	0.75	1.0	0.96	2nd	1.0	0.76	-
N. Africa & Middle East	0.9	0.52	0.7	0.02	1st	0.8	0.28	no
W. & C. Africa	1.2	0.05	1.3	0.01	1st	1.1	0.66	no
E. & S. Africa	1.1	0.39	1.0	0.87	2nd	0.9	0.78	n.s.
East Asia	0.9	0.55	1.0	0.81	2nd	1.2	0.52	n.s.
Other	1.1	0.70	1.1	0.42	1st	1.0	0.85	no

Notes: Models are estimated accounting for survey design. **In addition, the models control for covariates relating to education (highest qualification and years of education completed) and partnership history.** Each IRR shows the risk of birth relative to ancestral natives in that birth cohort, where an IRR of 1.0 means that women had the same completed fertility as ancestral natives. The ratio shows second generation IRRs divided by first generation IRRs. Hence, a value larger than 1.0 suggests higher fertility, relative to natives, for the second generation compared with the first. Convergence is assessed consistently using the following rules: ‘yes’ describes a movement toward native completed fertility (i.e. toward an IRR of 1.0) which is statistically significant at the 5% level ($p < 0.05$); ‘n.s.’ describes a movement toward native completed fertility which is not statistically significant at the 5% level; ‘no’ describes any movement away from native completed fertility, ‘-’ describes any situation where there is no initial different between the first and second generation as evidenced by a first generation IRR equal to 1.0; Source: UKHLS Wave 1 (author’s analysis).

5. What is the influence of childhood exposure to cultural norms? The role of segregation and community composition in explaining migrant fertility²

Abstract

There are a range of theories predicting that differences between migrant and native fertility are explained by exposure to cultural norms. However, only a handful of studies explore this prediction directly. This study proposes a new approach, which focuses on community composition in childhood. It uses longitudinal census data and registered births in England and Wales to investigate the relationship between completed fertility and multiple measures of community culture, including residential segregation. It does this for both first generation migrants and the second generation, as compared with ancestral natives. The results provide strong evidence in support of childhood socialisation, namely that migrant fertility is closer to native fertility for migrants who grow up in areas with a more dominant native community culture. Furthermore, exposure to ancestral culture may explain some of the variation in completed fertility for second generation women from Pakistan and Bangladesh, the only second generation group to have significantly higher

² The permission of the Office for National Statistics to use the Longitudinal Study is gratefully acknowledged, as is the help provided by staff of the Centre for Longitudinal Study Information & User Support (CeLSIUS). CeLSIUS is supported by the ESRC Census of Population Programme (Award Ref: ES/K000365/1). The results shown here are released under clearance number is 30135. The authors alone are responsible for the interpretation of the data. Census output is Crown copyright and is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

fertility than natives. This suggests one reason why the fertility of some South Asians in England and Wales may remain 'culturally entrenched'. All of these findings are consistent for different measures of community composition. They are also easier to interpret than the results of previous research because exposure is measured before childbearing has commenced, therefore avoiding many issues relating to selection, simultaneity and conditioning on the future.

5.1 Introduction

This article considers the links between culture and migrant fertility. More specifically, it considers the extent to which exposure to childhood cultural norms provides an explanation for differences in migrant and native fertility levels. A variety of cultural explanations have been proposed in order to explain these differences, including childhood socialisation, cultural entrenchment, and minority status (e.g. Goldberg, 1959, 1960; Goldscheider & Uhlenberg, 1969; Hervitz, 1985; Zarate & Zarate, 1975). Yet previous research has stated a need for more research that investigates the association between migrant fertility levels and measures of culture (Forste & Tienda, 1996; L. E. Hill & Johnson, 2004; Lichter, Johnson, Turner, & Churilla, 2012).

The concept of culture is an essential component of many theories relating to demographic behaviour. Cultural explanations have been used by demographers from Malthus to the present day, and they are an integral component of many socio-demographic theories including both the first and second demographic transition (Bachrach, 2013). Culture is expected to influence demographic outcomes like fertility or partnership behaviour through the effect of cultural norms and preferences (Cleland & Wilson, 1987; Davis & Blake, 1956; Fernández & Fogli, 2009; Forste & Tienda, 1996; Gjerde & McCants, 1995; Johnson-Hanks, Bachrach, Morgan, & Kohler, 2011; La Ferrara, Chong, & Duryea, 2012; Lesthaeghe & Surkyn, 1988; Lorimer, 1956). Although these norms and preferences are enacted by the individual, they are also expected to vary over time and space via a continuous process of social interaction (for

example with family, friends, and other members of local communities) (Bachrach, 2013; Hammel, 1990; Liefbroer & Billari, 2010). Despite this, it has been argued that demographers have frequently failed to acknowledge the complexity of this process, including the fact that culture is located and generated within a spatial context (Bachrach, 2013; Fricke, 2003; Hammel, 1990; Kertzer, 1997). There may be many reasons for this failure, including practical reasons such as lack of data. Nevertheless, demographic research has often struggled to integrate and evaluate the concept of culture, and in some cases this includes a failure to use measures of cultural variation in empirical analyses, even when studying hypotheses that are underpinned by cultural explanations (for a discussion related to migrant fertility, see: Forste & Tienda, 1996).

In response to these issues, most notably the need for valid empirical research, this article considers the relationship between culture and the completed fertility of immigrants and their descendants. As well as its importance for testing cultural explanations, an understanding of this relationship is important for helping to predict the impact of migration on population change and population composition. If migrant fertility has an effect on population size, then this has implications for a variety of policy areas, including health services, education, and pensions. Policy-makers therefore have a vested interest in understanding the differences in completed family size between migrants and natives. This is not only true for first generation immigrants, but also for subsequent (e.g. second) generations, which in turn suggests the need for more research that studies the completed fertility of different generations.

Since the early 1900s, researchers have tried to explain the existence of 'migrant fertility differentials', and provide reasons why migrant fertility is (often) different from native fertility (e.g. J. A. Hill, 1913; Kuczynski, 1901, 1902). Since then, a variety of theories have been proposed in order to explain migrant fertility, and many of these are founded upon the concept of culture. Tests of

the association between cultural measures and migrant fertility are therefore important because they provide evidence for or against particular hypotheses. For example, the childhood socialisation hypothesis predicts that migrant fertility levels will be affected by the fertility norms of the location in which migrants spend their childhood (Goldberg, 1959, 1960; Hervitz, 1985). As such, it can be assumed that research will struggle to evaluate this hypothesis unless it includes an analysis of exposure to childhood cultural norms.

Nevertheless, it is rare that research has used empirical measures of cultural difference to investigate migrant fertility. As Forste and Tienda point out, with reference to ethnic fertility, *"few studies have attempted to discern how cultural influences produce fertility differences"* (Forste & Tienda, 1996, p. 112). Where studies do include measures of culture, beyond indicators of ethnicity or country of birth, they usually focus on one aspect of cultural variation. Typically, this has either been language (Adserà & Ferrer, 2014; Bean & Swicegood, 1985; Marin, Gomez, & Hearst, 1993; Sorenson, 1988; Swicegood, Bean, Stephen, & Opitz, 1988), or an individual's exposure to cultural norms based on the population composition of their community (Abma & Krivo, 1991; Fischer & Marcum, 1984; Gurak, 1980; L. E. Hill & Johnson, 2004; Lopez & Sabagh, 1978). However, even when the relationship between migrant fertility and cultural variation has been analysed, it is hard to interpret the results of this research. In particular, there are inherent difficulties in evaluating associations between culture and fertility when culture is measured after childbearing has commenced. Individuals are usually at risk of having a child over at least a 30-year-long period, which raises questions about how and when to measure culture (including at what age or ages), how to measure fertility, and which method should be used to test the relationship between these various measures. Although some of the papers in the literature have used methods that are similar to each other, or analysed more than one measure of culture, these same issues of interpretation also mean that it is difficult to make comparisons between different cultural measures and their relationship to migrant fertility.

Our research seeks to address a number of these issues. It aims to develop the existing literature by focusing on exposure to cultural norms, and carrying out an analysis using multiple measures of this exposure. Our central research question is whether migrant fertility differentials are associated with the normative environment that migrants are exposed to during childhood. Furthermore, we posit that the magnitude of these differentials may depend on the strength of exposure to a native or non-native normative environment, and that these in turn are related to the population composition of a migrant's childhood community. In other words, we would expect differences between migrant and native fertility to be smaller if migrants spend their childhood residing in a community that has a predominantly native population (which in turn increases their exposure to native fertility norms), and larger when the childhood community has a higher concentration of immigrants.

The analysis extends previous research by combining a number of other methodological developments, most of which are made possible by the use of longitudinal data for England and Wales. These data allow a link to be made between aggregate-level census data (from 1971) and individual-level census data and registered births (from 1971-2009), which in turn allows an investigation of the associations between childhood community and completed fertility. In our analyses, the population composition of a childhood community is measured in several different ways, in terms of absolute numbers, proportions, or levels of segregation, (as explained in later sections). This allows us to explore the reliability of each of these measures and the robustness of our empirical findings.

Unlike previous research, culture is measured prior to childbearing, thereby avoiding issues of simultaneity or the possibility of conditioning on the future (which might be the case if culture were measured after childbearing had started). In addition, the use of completed fertility means that the results are not affected by missing data on future childbearing or by differences between groups in the timing of childbearing. The analysis uses hierarchical (multi-level)

models, which allows for some other area-level effects on fertility. Furthermore, results are obtained for both child migrants and the second generation, so that both groups can be compared with each other, and with respect to the native norm. The inclusion of the second generation is important because they are less likely to have spent as much (if any) of their childhood living outside England and Wales.

The next section provides further theoretical background, including an overview of the hypothesised links between culture, community composition, and migrant fertility. Section 5.3 then provides a detailed discussion of the method, describing how the analysis builds upon and extends existing research. It also introduces the data set and the statistical models that are used for the analysis. This is then followed by the analysis in section 5.4 and conclusion in section 5.5.

5.2 Background

Our research investigates the relationship between fertility and childhood community for different groups of migrants. This is motivated by an expectation that community composition is related to culture, in particular cultural preferences and norms, and that culture is associated with fertility. In this background section we first consider the literature on these two relationships, and then consider previous research on the specific links between community composition and fertility.

5.2.1 The relationship between culture and fertility

Although hard to define, culture has been conceptualised as a “*nested network of meanings*” (Bachrach, 2013, p. 1), which is continually evaluated by individuals through a process of social interaction (Hammel, 1990). As suggested by Davis and Blake (1956), we might expect that the most important cultural factors for childbearing are those that have the greatest influence on the proximate

determinants of fertility (Bongaarts, 1978), such as those that influence sexual behaviour, contraception, or partnership (Marin et al., 1993; Soler et al., 2000; Stephen, Rindfuss, & Bean, 1988). This aligns with the conceptual framework for migrant (and ethnic minority) fertility proposed by Forste and Tienda (1996). Their framework indicates that cultural factors may influence individual perceptions and goals relating to: (i) early childbearing, (ii) the sequencing of marriage and fertility, and (iii) completed fertility. As such, perceptions and goals can be seen as the factors that mediate the relationship between culture and completed fertility, either directly or through different stages of the childbearing life course. Culture has an influence on individual perceptions and goals through exposure to a normative environment, which in turn has an influence on childbearing, through associations with the proximate determinants of fertility. For many researchers, this process of environmentally-driven norm development is believed to take place largely during childhood. In particular, the *childhood socialisation* hypothesis predicts that migrant fertility levels will be driven by the fertility norms of the location in which migrants spend their childhood (Goldberg, 1959, 1960; Hervitz, 1985).

5.2.2 The relationship between residential community composition and culture

The influence of culture is an inherently spatial process, not least because residential location has an influence on individual interactions with the sources of cultural norms, such as social networks, families, and institutions (Coleman, 1994; Findley, 1980; Forste & Tienda, 1996). In its original formulation, segregation was seen as a barrier to the process by which all ethnic groups (including natives) may come to share a common culture (Burgess, 1928). With the development and revision of assimilation theory, this formulation has become more nuanced, but it remains clear that culture and residential context are intertwined (Alba & Nee, 2005; Portes & Zhou, 1993).

Despite this clarity, it remains uncertain precisely how culture and context are related, and how they interact to influence individual behaviour. As a first step, it may be important to recognise that culture is (at least partially) created through the dynamic relationship between individuals and social/macro environments (Bachrach, 2013). More specifically, it can be argued that individuals select their behaviour from a 'cultural repertoire' based upon the context in which they live (Hammel, 1990). In this sense, neighbourhood can be seen as a source of cultural influence (for some relevant discussions see: Knox & Pinch, 2006; Yancey, Ericksen, & Juliani, 1976; Zhou, 1997), which in turn has an influence on the processes by which individual preferences and norms are developed and expressed.

One of the most prominent assumptions of segregation research is that the population composition of a community, by ethnicity or country of birth, is indicative of the cultural milieu to which its residents are exposed (Forste & Tienda, 1996; Peach, 1996). It is worth noting that this assumption depends on at least two further conjectures: that community composition is a suitable proxy for cultural exposure (Ludi Simpson, 2004), and that actual exposure is the same as potential exposure (Hewstone, 2009; Sturgis, Brunton-Smith, Kuha, & Jackson, 2014). Also, we might note that: "*ethnicity is not a bag of norms producing automatic responses*" (Lopez & Sabagh, 1978, p. 1496), segregation might not lead to a failure to integrate (Vang, 2012), and evenness might not lead to contact (Massey & Denton, 1988). Nevertheless, community composition and cultural exposure are expected to be strongly associated, and this assumption is embedded within many of the theories and conceptual frameworks that have been developed by previous research on assimilation, segregation and ethnicity (e.g. Alba & Nee, 2005; Gordon, 1964; Park & Burgess, 1921).

5.2.3 The relationship between community composition and migrant fertility

The existence of linkages between segregation, culture, and fertility was first proposed at least 60 years ago (Lee & Lee, 1952). Since then, research has outlined in more detail how community composition is expected to influence childbearing because of exposure to different cultural norms (Abma & Krivo, 1991; Forste & Tienda, 1996; L. E. Hill & Johnson, 2004). These include the influence of community environment and community resources, both of which are related to the population composition of the community (e.g. the proportion of migrants, or the level of residential segregation). As such, community composition has an influence on adult supervision, peer groups, and role models, each of which may be particularly important for the development of perceptions and norms during childhood and adolescence (Brewster, 1994; Brewster, Billy, & Grady, 1993; Forste & Tienda, 1996; Hogan, Astone, & Kitagawa, 1985; Hogan & Kitagawa, 1985). In addition to shaping the uptake of cultural norms, the influences of local community factors and social context are likely to affect most stages of the childbearing life course (Findley, 1980). Similarly, previous research has anticipated a relationship between residential segregation and fertility (Coleman, 1994), which might be expected because they both relate to the processes of assimilation and integration (Duncan & Lieberman, 1959; Massey, 1981).

Using this motivation, a small number of studies have explored the links between community culture and migrant fertility, almost all of them in the US context. These studies can be further separated into those that measure fertility indirectly by studying adolescent sexual behaviour and contraceptive use (Brewster, 1994; Brewster et al., 1993; Hogan et al., 1985; Hogan & Kitagawa, 1985), and those that measure fertility directly. Of these, almost all studies have focused on Mexican Americans (Abma & Krivo, 1991; Fischer & Marcum, 1984; Gurak, 1980; L. E. Hill & Johnson, 2004; Lopez & Sabagh, 1978), although other contexts have also been studied (Nauck, 1987, 2007).

Studies using direct measures of fertility have focused on the combination of cultural context and normative context (Abma & Krivo, 1991). In other words, they consider the community cultural norms relating to specific combinations of migrant origin, ancestry, and destination (which themselves explain much of the variation in migrant fertility differentials, e.g. Ford, 1990; Haug, Compton, & Courbage, 2002; Kahn, 1994; Sobotka, 2008; Zarate & Zarate, 1975). One of the first papers to study migrant fertility using measures of community culture was a study of Chicanos (i.e. Mexican Americans) living in Los Angeles. This study concluded that high Chicano fertility was explained, among other things, by community culture (Lopez & Sabagh, 1978). This study explored the fertility of a sample of women who had yet to complete their childbearing, and used a bespoke measure of community culture based on the *“ethnic homogeneity of neighborhood and husbands' fellow workers”* (Lopez & Sabagh, 1978, p. 1493). Similarly, a study of Mexican Americans in Austin (Texas) found a positive correlation between neighbourhood ethnic composition and Mexican American fertility (Fischer & Marcum, 1984). In explaining this result, the authors stated their expectation that: *“pronatalist Mexican American norms are reinforced in rough proportion to the extent of daily interaction with other Mexican Americans”* (Fischer & Marcum, 1984, p. 591).

Further evidence has been provided by research using a nationally representative sample of Mexican Americans, which found that fertility was positively associated with the percentage of Mexican Americans living in a neighbourhood (Gurak, 1980). Moreover, a study using 1980 US Census data showed a significantly higher probability of having of a birth within the last three years for Mexican Americans living in an area with a higher proportion of Mexican Americans (Abma & Krivo, 1991). A more recent study of Mexican and Central Americans used nationally representative data from the US Current Population Survey in 1995 and 1998 to explore the relationship between fertility (for different migrant generations), and a series of neighbourhood characteristics based on the US Census in 1990 (L. E. Hill & Johnson, 2004). Somewhat surprisingly, the results suggest that the number of children ever

born may be lower in neighbourhoods with a higher percentage of Hispanics (or Asians). However, this result was not consistent across migrant generations.

5.3 Method

Taken together, the results of previous research suggest an ambiguous picture of the relationship between community composition, culture and migrant fertility. In part, this may be due to the use of methods and measures that are not the most appropriate for testing this relationship. In this section we discuss five decisions relating to research design and methodology, with regard to previous research and to the analysis undertaken here.

5.3.1 Building upon previous research

The first decision is how to measure fertility. Here we argue that completed fertility is the most appropriate measure for investigating the direct links between community culture and migrant fertility. Each of the previous studies (of these direct links) has considered populations of women who have yet to complete their childbearing (e.g. women aged 15 to 44), and only one of them attempted to consider completed fertility (by combining actual births with fertility intentions: Fischer & Marcum, 1984). However, if only part of childbearing life course is considered, and not all women have completed childbearing, then research on migrant fertility is particularly susceptible to variations in birth timing between groups, and this can lead to erroneous conclusions about migrant fertility levels (Parrado, 2011; Parrado & Morgan, 2008; Toulemon & Mazuy, 2004). When comparing migrants and natives, it is likely that there will be differences in the timing of births because first generation migrant fertility is known to be highly correlated with age at migration (Adserà et al., 2012; Andersson, 2004). Research on the distortion of immigrant period total fertility rates (TFRs) also shows that individual fertility can be elevated shortly after migration (Robards, 2012; Toulemon, 2004, 2006;

Toulemon & Mazuy, 2004). These issues can be avoided by studying a sample of women who have completed their fertility.

The second decision to consider is when, during an individual's life course, to measure community composition. In the analysis that follows we use childhood measures, for two reasons. The first is theoretical. It is expected that childhood culture will have a strong influence on migrant fertility across the life course (Adserà et al., 2012), and that childhood is a critical period for the formation of cultural norms and preferences relating to childbearing (Forste & Tienda, 1996). The second is methodological. In previous research, community composition is measured at only one period of time, and this measurement occurs at different stages of the life course for different women in the study. This makes it difficult to interpret any association between community composition and fertility, which will depend upon the composition of the sample at a given moment in time. Although some migrants will remain resident in the same community after arrival, others will experience a variety of community contexts across their childbearing years (both before and after any specific time-point). One way around this might be to use a time varying measure of community context, but this would not resolve the selection problem that a migrant's fertility itself is likely to affect migration between communities (e.g. Kulu, 2005; Zarate & Zarate, 1975). For example, if community context is measured during childbearing, then its relationship with fertility outcomes could be confounded by selective migration from cities to suburbs (Kulu & Boyle, 2009; Kulu, Boyle, & Andersson, 2009; Kulu & Washbrook, 2014). This complexity is avoided if we investigate community culture during childhood, measured prior to the commencement of childbearing. Supported by the theoretical relevance of investigating childhood measures, this is the approach taken here.

As a third consideration, it is necessary to decide how to measure community culture in a way that is appropriate for investigating migrant fertility. In the US studies discussed above, the most commonly used measure is

the proportion of Mexican Americans living in the community. But a range of alternative measures can be proposed, not least when considering the many other candidates that are discussed in the literature on residential segregation (Massey, 1985; Massey & Denton, 1988). In this research, we use and compare a range of different measures, as explained later in this section.

The fourth methodological consideration is which variables, other than community composition, should be accounted for in the analysis in order to control for other characteristics, of the childhood community and of the individual, which may also be associated with fertility. As explained below, our analysis uses statistical multilevel models to account for community characteristics, with specific community-level and individual-level variables included as control variables. In addition to being constrained by the variables that are available in the LS data, the choice of covariates is informed by the fact that we are investigating area of residence in childhood. This means that mediating variables, which occur between childhood and the completion of fertility, are excluded. The covariates chosen for this analysis are therefore: birth cohort (age in 1971) and parental social class. These are described in more detail below.

The fifth consideration is how to define migrant and native generations, and which generations to consider in the analysis. Here, we focus on child migrants, who are defined as foreign-born women aged under-16 on arrival, and on the second generation, who are born in England and Wales, but have at least one foreign-born parent. In general, it can be argued that a more nuanced understanding of assimilation can be gained by distinguishing between the first and second generation (L. E. Hill & Johnson, 2004). This includes the advantage that the fertility of native-born women can be calculated without the inclusion of the second generation, who may otherwise distort the native norm. Additionally, in the context of this study, the examination of second generation fertility has a further advantage because they are likely to have lived in native communities for the whole of their lives. This implies that any effect of

community composition is less likely to be confounded than the results for child migrants, who will have lived abroad for at least part of their childhood.

Aiming to build upon previous research, this study therefore takes into account these issues in order to incorporate a number of methodological developments, and explore the association between completed fertility and a range of measures of community (cultural) composition. The analysis tests the childhood socialisation hypothesis, which predicts that: *migrant fertility is closer to native fertility for migrants who grow up in areas with a more dominant native community culture*. The hypothesis is investigated using longitudinal data for England and Wales for both first generation child migrants and the second generation. The results of this test also provide insight into other cultural explanations, including assimilation and cultural entrenchment.

5.3.2 The data set

Our analysis uses individual-level data from the Office for National Statistics (ONS) Longitudinal Study (LS) (CeLSIUS, 2014; Dale, Creeser, Dodgeon, Gleave, & Filakti, 1993; ONS, 2014). The LS data set links decennial census data from the four censuses between 1971 and 2011 for a sample of around 1% of the population of England and Wales, (i.e. a little over 500,000 individuals at each census and around one million over the course of the study as new sample members are added in each decade). In addition, the LS contains register data on vital events, including births registered in England and Wales since 1971.

The accuracy of the LS data has been investigated in general (Blackwell, Lynch, Smith, & Goldblatt, 2003; Hattersley & Creeser, 1995), and with respect to migration and fertility (Hattersley, 1999; Robards, Berrington, & Hinde, 2011, 2013; Wilson, 2011). One problem with the data is that the immigration and emigration of LS members is sometimes not recorded (Robards et al., 2013), so some immigrants may be missing from the dataset (although many missing immigrants will enter the LS dataset when they are recorded during the census after their migration). This issue is avoided here because the sample is restricted

to a specific cohort, namely those women who were aged under-16 in 1971 and who were included in the 1971 census. The analysis therefore excludes adult migrants who arrived after 1971. Our sample also excludes women who were not recorded in the 2001 census (due to death or emigration), and a small proportion of those who were recorded in the 2001 census (4%) who had missing values in the focal variables. Appendix table A5.1 shows the derivation of the final analytical sample, which includes 50,152 women. Of these, 44,168 are ancestral natives (UK-born women whose parents are both UK-born), 4,910 are from the second generation (UK-born women with at least one foreign-born parent, only 4% of whom had parents from different country of birth groups), and 1,074 are first generation child migrants (women born outside the UK who had moved to the UK by the time they were recorded in the 1971 census).

5.3.3 The variables

The dependent variable used throughout the analyses is an individual woman's completed fertility, defined as the total number of children the woman has had by the age of 40. This is calculated using the 'maximum method', which is the maximum number of births identified using either registered births or the own-child method (Wilson, 2011). Building upon previous research, we use several different measures of community composition. Each of them attempts to capture variation in childhood exposure to cultural norms, and is therefore measured using aggregate data from the 1971 Census (when all sample members are under-16) (UK Data Service, 2014). These data are for the entire census population in 1971. They were analysed separately and then linked to the individual-level data in the LS.

Before creating the variables, it was necessary to decide which level of geography should represent a community, and four alternatives were available in the whole-census (aggregate) data. With approximate average population size in England in brackets, these were: county (1,000,000), local authority (38,000), ward (3,000) or enumeration district (450) (Martin, 2008). Local

authorities were chosen, and this choice was guided by the aim of choosing the most appropriate area within which an individual would experience and absorb cultural norms relating to fertility. This included consideration of the likely range of individual mobility, including for travelling to work, community activities, social activities, and partnership behaviour (e.g. marriage markets). It was also noted that previous research has cautioned against the use of very small areas *"because of neighborhood selectivity by family type"* (Abma & Krivo, 1991). In addition, we note the 'modifiable areal unit problem', which suggests that the result may be influenced by the choice of areal unit (Flowerdew, 2011; Openshaw, 1984).

Previously, the most common measure of community culture has been the proportion of total community population that share the same ethnicity as the ethnic group being studied. This can either be thought of as a measure of 'exposure to the same group', or as its inverse, a lack of exposure to other groups (L. Simpson, 2007, p. 407). We also use this approach, with some slight modifications. It has been argued that studies of minority fertility should consider the size of the minority population (Kennedy, 1973), and that there may be an effect of community population size on fertility (Findley, 1980), so we consider both the absolute size and relative proportion of the minority group. Also, we use country of birth instead of ethnicity as the variable on which the calculations are based, in order to focus on the influence of non-native or origin culture irrespective of self-identification. Ethnic groups include different generations of migrants, many of whom may have 'assimilated'. This implies that, had we used ethnic community composition instead, the results might be confounded by selection out of (and into) ethnic groups. Furthermore, in this analysis it was decided to use two different definitions of place of birth. The first is a crude measure which defines individuals as UK-born or not, thus placing the whole foreign-born population in one group. The second defines place of birth as the country of birth of each individual, and uses the most detailed country of birth groups that were available in the data (which are shown later in table 5.1 and figure 5.2).

In addition to these measures of population size, we also considered residential segregation. This can be loosely defined as the geographical evenness of groups in an area (L. Simpson, 2007, p. 407), in other words, how the population of a group is distributed across smaller areas within the larger area of interest. To the best of our knowledge, this has not been considered before in research on migrant fertility. Here the smaller areas were taken to be wards within local authorities (LAs). The measure of residential segregation that we use is the index of dissimilarity (ID; see e.g. Simpson 2007), which is defined as follows. Let N_{igk} denote the total population size of group g in Ward k in LA i and $N_{ig} = \sum_k N_{igk}$ the size of the group in the LA overall, and let $N_{i\bar{g}k}$ and $N_{i\bar{g}} = \sum_k N_{i\bar{g}k}$ be the population sizes similarly of those who are not members of group g . The index of dissimilarity of group g in LA i is defined as $ID_{ig} = 0.5 \sum_k |N_{igk}/N_{ig} - N_{i\bar{g}k}/N_{i\bar{g}}|$, where g depends upon the statistical model being estimated, and is either the entire foreign-born population (model A5), or the foreign-born population in the same country of birth (or parental country of birth) group as each migrant woman in the model (models A6, B3 and C3). The index of dissimilarity can take on values between 0 and 1.

The measures of community composition used here are therefore:

1. *The population of each Local Authority that is foreign-born, measured according to: (a) size, and (b) proportion*
2. *The population of each Local Authority that is in the same country of birth (or parental country of birth) group, by: (a) size, and (b) proportion*
3. *The index of dissimilarity at Local Authority level using Ward-level data, for (a) the foreign-born population, and (b) the population in the same country of birth (or parental country of birth) group*

It may be useful to note that in all of the models that are estimated, community composition is only measured for migrant women. In other words, non-migrant women are placed in a single group, and are not distinguished according to levels of community composition. This is because we are focused on the effect of community composition on migrant fertility.

One further consideration is the fact that regression results using the size or proportion of area-level populations are affected by the distribution of these measures over the areas themselves. This may be less of an issue if only one area-level measure is used, but it could create problems for studies like this which seek to compare measures. It would also create problems here for the measures that match people to their country of birth groups. For example, the proportion of the population that is Irish in 1971 is on average far larger than the proportion that is Pakistani. As such, the magnitude of a variable that matches individuals to the proportion of their country of birth group will be far greater for the Irish-born, irrespective of whether the area has relatively high or relatively low proportions of people who are Irish-born.

Given this issue, and the desire to compare results across measures, each measure was standardised by: (a) ranking the local authorities, (b) placing each local authority in one of three percentile groups to represent high, medium, and low levels of immigrant culture, and (c) assigning the percentile group as the measure of the composition of an individual's local authority. In most cases, the percentile groups that are used are: top 5%, 5-25%, and bottom 75%. These 'top-heavy' groupings are chosen because migrants are, on average, more likely to be resident in areas that have a higher number or proportion of migrants (or higher levels of residential segregation). In some analyses, for example when focusing on South Asian migrants only, different groupings were used because almost all individuals would have otherwise been classified into a single category.

The other variables used in the analysis are: birth cohort (age in 1971) and parental social class. These are measured for all sample members. Age is included as an indicator of birth cohort, and in particular because sample members have different ages in 1971 (when the childhood indicators are measured). Parental social class is included in order to represent the socio-economic background in which children are raised, which may in turn affect their completed fertility.

5.3.4 The statistical models

Let Y_{igj} denote the completed fertility of individual j in area (local authority) i , where the individual belongs to country of birth group g . Conditional on the explanatory variables introduced below, Y_{igj} is taken to follow a Poisson distribution. To define explanatory variables for Y_{igj} , let Z_{1igj} be an indicator variable for whether or not the individual is a foreign-born child migrant, Z_{2igj} a similar indicator for the second generation (so both of these are 0 for ancestral natives), and \mathbf{X}_{ig} a vector of indicator variables for the percentile groups, as defined above, for a particular measure of community composition of area i with respect to group g . The models may also include other individual-level explanatory variables \mathbf{W}_{igj} and other area-level variables \mathbf{V}_i . Letting μ_{igj} denote the expected value of Y_{igj} , this is modelled as:

$$\log(\mu_{igj}) = \alpha_0 + \boldsymbol{\beta}_1[Z_{1igj}\mathbf{X}_{ig}] + \boldsymbol{\beta}_2[Z_{2igj}\mathbf{X}_{ig}] + \boldsymbol{\alpha}_1\mathbf{W}_{igj} + \boldsymbol{\alpha}_2\mathbf{V}_i + u_i \quad (1)$$

, where u_i is a normally distributed random variable with mean 0 and variance σ_u^2 , independent of the explanatory variables. The model is thus a Poisson log-linear model with a random intercept, a multilevel model (Goldstein, 1999; Jones, 1991) where the purpose of the random intercept u_i is to account for the remaining area-level variation after controlling for \mathbf{V}_i . All the models were estimated using Stata version 11.

In model (1), the elements of $\boldsymbol{\beta}_1$ are the regression coefficients associated with being a child migrant rather than ancestral native, for individuals in areas with different community compositions (as defined by \mathbf{X}_{ig}) and $\boldsymbol{\beta}_2$ are the coefficients for being a member of the second generation. The exponentiated value of an element $\boldsymbol{\beta}_1$ or $\boldsymbol{\beta}_2$ is the ratio of the expected completed fertility of a child migrant or a member of the second generation in an area of a particular composition, relative to an ancestral native woman with the same characteristics \mathbf{W}_{igj} in the same area. These ratios, labelled 'IRR' in the tables below, are the quantities of foremost interest in our analyses.

5.4 Analysis

5.4.1 Summary statistics and completed fertility

Table 5.1 shows the number of ancestral natives in the sample, as well as the distribution of first generation child migrants and the second generation by ancestral group. The analysis is limited to the country groups shown in table 5.1 because these are the most detailed groups available in the aggregate data for the 1971 Census that are used to calculate the community composition variables. The groupings reflect international geography in 1971. For example, present-day Pakistan and Bangladesh are grouped together because Bangladesh was still in the process of being recognised as independent (including by some Census respondents).

Table 5.1: Frequencies by generation and (ancestral) country of birth

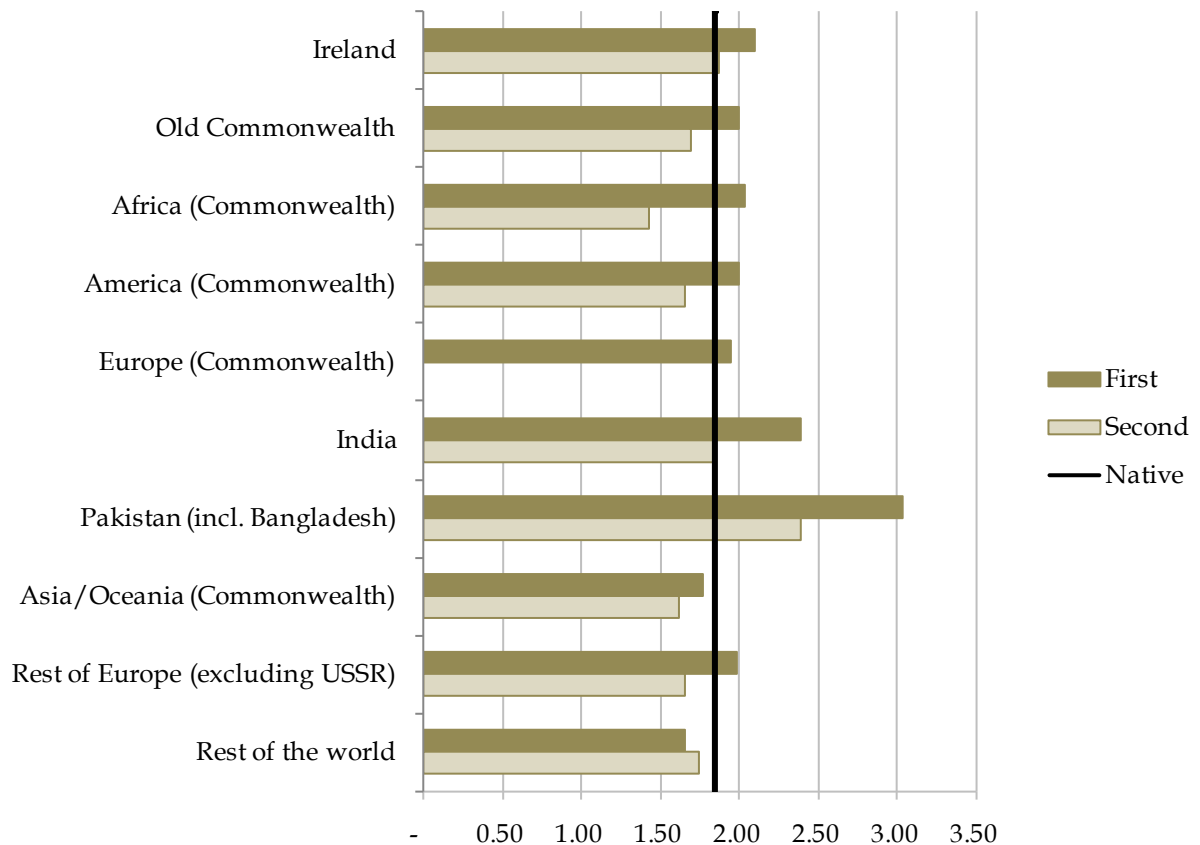
Ancestral country of birth: using 1971 codes	Second generation	% of total	Child migrants	% of total
England & Wales ¹				
Ireland	1,776	36	58	5
Old Commonwealth	145	3	76	7
Africa (Commonwealth)	126	3	185	17
America (Commonwealth)	746	15	84	8
Europe (Commonwealth)	0	-	96	9
India	433	9	145	14
Pakistan (incl. Bangladesh)	115	2	72	7
Asia/Oceania (Commonwealth)	69	1	97	9
Rest of Europe (excluding USSR)	953	19	194	18
Rest of the world	334	7	67	6
Parents from different COB groups	213	4		
Total	4,910		1,074	

1: The total number of ancestral natives is 44,168; Source: Author's analysis using Office for National Statistics Longitudinal Study data.

Table 5.1 shows that there are more members of the second generation than first generation child migrants, both overall and for most ancestral groups. On average, child migrants have a higher completed fertility (2.06 children per

woman) than ancestral natives (1.85), whereas second generation women have a lower completed fertility (1.77). This is shown in appendix table A5.2, which also indicates the distribution of other explanatory variables for these generations.

Figure 5.2: The completed fertility of different ancestry and generation groups relative to ancestral natives



Note: The figure shows the mean completed fertility for migrants (by generation and ancestry) relative to the average cumulative number of births for natives (which is equal to 1.85); There are no second generation women from the European Commonwealth; Source: Author's analysis using Office for National Statistics Longitudinal Study data.

Although average levels of completed fertility are indicative of the childbearing of each generation, there is considerable variation by ancestry. Figure 5.2 shows the completed fertility of different ancestry and generation groups relative to ancestral natives. The most distinct ancestral group is Pakistanis and Bangladeshis, who have around 50% higher completed fertility than natives for the first generation, and around 30% higher for the second. This is in contrast to New Commonwealth migrants from Asia/Oceania (including Hong Kong, Malaysia, and Singapore), as well as the residual category 'Rest of the world', where the first and second generation both have lower completed fertility than natives.

5.4.1 Models of completed fertility and exposure to community culture

Based on the childhood socialisation hypothesis that is tested here, the central question is whether completed fertility is closer to the native norm for migrants who grow up in areas with a more dominant native community culture. Table 5.3 shows the results of six different models, specified as explained in the previous section. The models use different measures of exposure to community cultural norms, and each model allows the association between exposure and completed fertility to be different for the first and second generation.

Table 5.3: Exposure to community culture and its association with migrant fertility (models for all migrants)

	<i>model A1</i>		<i>model A2</i>		<i>model A3</i>		<i>model A4</i>		<i>model A5</i>		<i>model A6</i>	
	Ranked size of foreign-born population		Ranked proportion of population that is foreign-born		Ranked size of individual's COB group population		Ranked proportion of population that is same COB group		Ranked index of dissimilarity		Ranked index of dissimilarity of individual's COB group population	
Variable	IRR	SE	IRR	SE	IRR	SE	IRR	SE	IRR	SE	IRR	SE
Area rank: foreign-born child migrants ¹												
Top 5%	* 1.14	0.03	* 1.09	0.04	* 1.15	0.03	* 1.13	0.03	* 1.25	0.06		
5-25%	1.05	0.04	* 1.12	0.04	1.00	0.04	1.07	0.05	* 1.14	0.04	* 1.16	0.05
Lower 75%	0.94	0.05	1.02	0.04	0.96	0.05	1.00	0.04	0.97	0.03	* 1.05	0.03
Area rank: second generation ¹												
Top 5%	* 0.95	0.01	* 0.96	0.02	* 0.96	0.01	0.97	0.02	0.95	0.03		
5-25%	0.97	0.02	* 0.94	0.02	0.96	0.02	* 0.92	0.02	0.97	0.02	0.96	0.02
Lower 75%	* 0.90	0.02	* 0.94	0.02	* 0.90	0.02	* 0.93	0.02	* 0.93	0.01	* 0.94	0.01
Parental social class (in 1971) ²												
Either parent has high SEC	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Neither parent has high SEC	* 1.12	0.01	* 1.12	0.01	* 1.12	0.01	* 1.12	0.01	* 1.12	0.01	* 1.12	0.01
SEC unknown for both parents	* 1.20	0.02	* 1.20	0.02	* 1.20	0.02	* 1.20	0.02	* 1.20	0.02	* 1.20	0.02
Age (in 1971) ²	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00

* Significant at the 5% level; 1: Factors measured for migrants only; 2: Covariates measured for all sample members; Note: COB = Country of birth; The outcome for all models is completed fertility (the number of children born to each woman up to 2009); All results are obtained from hierarchical multilevel Poisson models where women are nested in Local Authorities; Source: Author's analysis using Office for National Statistics Longitudinal Study data.

For example, the results of the first model (A1) show that there is no significant difference between the completed fertility of natives and those first generation child migrants who live in (the 75% of) local authorities that had the smallest number of foreign-born residents (IRR=0.94). For this, and all other area rank results, the completed fertility of natives is the reference category (IRR=1.0). Using a significance level of 5% (which is used throughout unless otherwise stated), there is also no significant difference between the completed fertility of natives and child migrants living in local authorities that were ranked in between the top 5% and the top 25% in terms of foreign-born population size (IRR=1.05). This is in contrast to those who are ranked in the top 5%, who do have significantly higher completed fertility (IRR=1.14). As such, we can conclude that a higher completed fertility than the native norm is more likely for first generation migrants who arrived in England and Wales as children, and spent (some of) their childhood in the local authorities that had the largest numbers of foreign-born residents.

As with the rest of the models in table 5.3, this first model includes controls for age and parental social class. The effects of each of these are fairly constant across models. Women who are older (i.e. from an earlier birth cohort) have a slightly higher completed fertility, whereas women have fewer children if either of their parents were in a professional or intermediate social class in 1971.

5.4.2 Results for the first generation

The results of model A1 in table 5.3 suggest that first generation migrant women are less likely to have the same level of fertility as natives if they spend their childhood living in an area where they are less likely to be exposed to native culture. This interpretation depends upon the extent to which foreign-born population size is a valid indicator of exposure to native culture, and this issue of 'construct validity' (Shadish, Cook, & Campbell, 2002) is one

motivation for testing a series of different measures, each of which is intended to represent exposure to cultural norms.

Considering the first generation alone, each of the six models in table 5.3 provides some evidence in support of the hypothesis that migrant fertility is closer to native fertility for migrants who grow up in areas with a more dominant native community culture. In the first five models, there is no significant difference between the completed fertility of natives and migrants who spent some of their childhood in local authorities where they were more likely to be exposed to native norms (in model A6 the result is just significant at 5% for migrants in the least segregated areas). This is in contrast to the significantly higher completed fertility for migrants who were least likely to be exposed to native norms (i.e. ranked in the top 5% of exposure to non-native norms). This is irrespective of the variable that is used to measure exposure to native norms, (although there is some variation in point estimates and standard errors).

For example, immigrants who spent their childhood in one of the 5% most segregated local authorities gave birth to 25% more children (on average) than natives, which was significantly more than both natives and migrants who spent their childhood in one of the 75% least segregated local authorities. This is substantively similar to the results using a measure of the size of population that is in same country of birth group as the respondent. With this measure, migrants who spent their childhood in a local authority that was ranked in the top 5% gave birth to 15% more children than natives. Whereas those who spent their childhood in a local authority ranked in the lowest 75% gave birth to slightly fewer children than natives on average (IRR=0.96). These results that use matched country of birth (as shown in models A3 and A4) are important because they take some account of migrant heterogeneity.

5.4.3 Results for the second generation

Following the same logic as the results for the first generation, second generation completed fertility should be closer to the native norm for migrants who spent their childhood in areas where they were most likely to be exposed to this native norm (e.g. the least segregated areas). However, the results of all six models are inconsistent with this expectation. For example, second generation women who lived in the least segregated areas have significantly lower fertility than natives, whereas those who lived in the most segregated areas are not significantly different from the native norm (model A5).

An alternative way to interpret these results is to hypothesise that exposure to non-native norms has the effect of raising fertility (on average). When combined with the recognition that second generation fertility is on average lower than that of natives, this leads to the expectation that, similar to the first generation, second generation fertility will be higher for women who lived in areas that had a greater number or proportion of (similar) migrants, or in areas that were more segregated. This explanation accords with the results to a greater extent, but the results still show considerable uncertainty. In particular, it is difficult to interpret the results because migrants are not separately identified by ancestral origin in these models.

Table 5.4: Community culture and fertility - models for Pakistanis / Bangladeshis

	<i>model B1</i>		<i>model B2</i>		<i>model B3</i>	
	Ranked size of Pakistani population		Ranked proportion of population that is Pakistani		Ranked index of dissimilarity	
Variable	IRR	SE	IRR	SE	IRR	SE
Factors measured for Pakistanis/Bangladeshis only						
Area rank: child migrants						
Top 2%	* 1.61	0.16	* 1.74	0.24		
3-5%	* 1.71	0.17	* 1.63	0.15		
Bottom 95%	1.31	0.26	* 1.46	0.20		
Top 40%					* 1.75	0.15
Bottom 60%					* 1.40	0.16
Area rank: second generation						
Top 2%	* 1.57	0.13	* 1.56	0.20		
3-5%	* 1.29	0.14	* 1.49	0.13		
Bottom 95%	0.95	0.14	1.04	0.11		
Top 40%					* 1.41	0.10
Bottom 60%					1.18	0.13
Covariates (for all sample members)						
Age (in 1971)	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00

* Significant at the 5% level; Note: The outcome for all models is completed fertility (the number of children born to each woman up to 2009); All results are obtained from hierarchical multilevel Poisson models where women are nested in Local Authorities; Source: Author's analysis using Office for National Statistics Longitudinal Study data

Table 5.5: Community culture and fertility - models for Indians

	<i>model C1</i>		<i>model C2</i>		<i>model C3</i>	
	Ranked size of Indian population		Ranked proportion of population that is Indian		Ranked index of dissimilarity for Indian-born population	
Variable	IRR	SE	IRR	SE	IRR	SE
Factors measured for Indians only						
Area rank: child migrants						
Top 2%	* 1.28	0.10	* 1.30	0.11		
3-5%	* 1.31	0.11	* 1.29	0.11		
Bottom 95%	0.91	0.17	1.06	0.14		
Top 40%					* 1.34	0.08
Bottom 60%					0.94	0.12
Area rank: second generation						
Top 2%	1.06	0.07	1.05	0.08		
3-5%	1.04	0.07	1.06	0.06		
Bottom 95%	0.94	0.06	0.94	0.05		
Top 40%					* 1.11	0.05
Bottom 60%					0.87	0.05
Covariates (for all sample members)						
Age (in 1971)	* 1.01	0.00	* 1.01	0.00	* 1.01	0.00

* Significant at the 5% level; Note: The outcome for all models is completed fertility (the number of children born to each woman up to 2009); All results are obtained from hierarchical multilevel Poisson models where women are nested in Local Authorities; Source: Author's analysis using Office for National Statistics Longitudinal Study data

5.4.4 South Asian ancestral groups

In order to take better account of cultural differences between migrant groups in a test of childhood socialisation, it is desirable to focus on singular ancestral origin groups. This analysis therefore focuses on South Asians, who are of particular interest in England and Wales because their fertility has typically been found to be higher than that of natives (Coleman, 1994; Coleman & Dubuc, 2010; Dubuc, 2012; Dubuc & Haskey, 2010; Sigle-Rushton, 2008). As shown in figure 5.2, the two first generation groups with the highest completed fertility are Pakistanis/Bangladeshis (who are combined throughout in this analysis) and Indians. For these two groups, as well as second generation Pakistanis/Bangladeshis, their completed fertility is much higher than that of ancestral natives.

Considering these ancestral groups separately, the results for Pakistani/Bangladeshi ancestry provide further evidence in support of the childhood socialisation hypothesis (table 5.4). Using area level variables that are matched to the same ancestral group – i.e. the size or proportion of population from Pakistan/Bangladesh – there is a significant and substantial difference in completed fertility between natives and first generation migrants who lived in the highest 2% of local authorities (i.e. those most likely to be exposed to the cultural norms of Pakistan/Bangladesh). This compares with those Pakistanis/Bangladeshis who lived in local authorities which had the lowest number or proportion of Pakistanis/Bangladeshis, whose completed fertility is not significantly higher than the native norm (in the case of population size) and is comparatively smaller (in the case of both size and proportion).

Importantly, the results for second generation Pakistani/Bangladeshi women follow a similar and more striking pattern, such that growing up in an area with a high likelihood of exposure to Pakistani/Bangladeshi cultural norms is associated with having significantly higher completed fertility than natives. Those who grew up in the highest 2% of local authorities (by size and

proportion) had 50% more children than natives (a result which is significant), whereas the completed fertility of those in the lowest 95% was not significantly different from the native norm. This pattern is similar when the analysis is repeated using the ranked index of dissimilarity for Pakistanis/Bangladeshis. Based on these results, it would appear that the higher fertility of both first and second generation women from Pakistan/Bangladesh may be partially explained by childhood socialisation.

Similar results for women of Indian ancestry are shown in table 5.5. On average, first generation Indians have higher fertility than natives, and as with the results for women from Pakistan/Bangladesh, at least some of this difference can be explained by the different community composition in which Indian women spend their childhood. At the 5% level, completed fertility was significantly higher than that of natives for those who lived in local authorities with the largest number and highest proportion of Indians. Completed fertility was not significantly higher for those who lived in local authorities with the smallest number and lowest proportions. The same result is evident when the analysis was repeated using the index of dissimilarity, calculated for the Indian population. Although the results for second generation Indians showed similar patterns to the results for second generation Pakistanis/Bangladeshis, none of the area level variables were significant at the 5% level, except for those in the areas which had the highest index of dissimilarity.

5.5 Conclusion

Despite the fact that culture is implicit in the majority of theories about migrant fertility, very few studies of migrant fertility have explored measures of cultural difference, beyond indicators of ethnicity and country of birth. Spatial dimensions of cultural difference have rarely been considered, and when they have, studies have derived conflicting conclusions about the existence, and the direction, of an association between migrant fertility and exposure to normative cultural environments.

This research set out to address these issues, and to test the childhood socialisation hypothesis, which predicts that migrant fertility is closer to native fertility for migrants who grow up in areas with a more dominant native community culture. This research used a range of measures for childhood cultural exposure, and applied several other methodological developments. This included strategies to take account of migrant heterogeneity by ancestry: differentiating between the first and second generation, using a measure of community composition that matches each individual's country of birth group, and carrying out separate analyses of two South Asian groups, Indians and Pakistanis/Bangladeshis. Although the findings here are certainly not unanimous, they provide consistent evidence for the childhood socialisation hypothesis.

In general, first generation migrants who were more likely to be exposed to native cultural norms as children did not have significantly different completed fertility than the native norm. The results were less conclusive for the second generation, although they suggest that exposure to ancestral culture may explain some of the variation in completed fertility for Pakistani/Bangladeshis, the only second generation group to have significantly higher completed fertility than natives. These results suggest one reason why the fertility of some South Asian immigrants and their descendants might remain culturally entrenched, namely they show that an increased exposure to South Asian cultural norms may promote or reinforce preferences for a higher completed fertility than is the norm in England and Wales. For Pakistanis/Bangladeshis, this also holds for the second generation. Given the novelty of this finding, it is recommended that further work be carried out to explore the links between community culture and fertility for the descendants of immigrants from Pakistan and Bangladesh. Residential segregation is expected to reduce over time for the children of immigrants (Massey & Denton, 1985; Waters & Jiménez, 2005), so it would also be useful to incorporate a changing measure of community culture in this analysis.

The existence of 'exposure to cultural norms' as a mechanism for influencing migrant fertility has implications for assimilation theory. As well as suggesting that more research is needed to identify other mechanisms of fertility assimilation, this also suggests a fruitful avenue for further research, namely to investigate the connection between different assimilation outcomes. Our analysis highlights the value of considering the association between two dimensions of assimilation, namely residential segregation and fertility, and offers some support for the fact that assimilation outcomes are interconnected. The results are also important for understanding one reason why migrant fertility might vary from that of natives. This requires further investigation, but provides some valuable insight that can be used by policy-makers and those who are preparing population projections.

As discussed prior to the analysis however, there are several potential challenges to the conclusions that are given above. Chief among these is the extent to which community composition represents exposure to cultural norms. It is true to say that exposure does not necessarily imply either contact or changing fertility preferences. This inference is provided by theory, and further evidence is required in order to test the assumption that community composition is an appropriate proxy measure of cultural influences on fertility behaviour. Further research is also required to determine the extent to which these results might be susceptible to their reliance upon the measurement of childhood community culture in a single year (which cannot be tested using the LS data because it only allows this to be measured for 1971). It may be that the results are affected, to a greater extent than is assumed here, by changing population composition, area social contiguity, and migration. It could be argued that some communities are more established than others, and better able to transmit cultural norms, irrespective of population composition.

It is interesting to note that more recent incarnations of assimilation theory have argued for a notion of composite culture, which moves beyond the consideration of static cultural groups delineated by ethnic boundaries (Alba &

Nee, 2005). As mentioned, the ancestry groups that are used here were restricted in detail by data availability, and it would certainly be desirable to have more detailed groups. Also, future research would benefit from including measures of attitudes, preferences and norms relating to ancestral culture, as well as perceptions of the destination (the country or the area). It would also be useful to include measures that show whether the first and second generation have links to their ancestral origin country (e.g. relatives left behind, return visits, remittances), as this may be another source of cultural norms. Finally, despite the methodological challenges, it is recommended that research be carried out to investigate how changes in community composition over the childbearing life course are related to the level and timing of migrant fertility. As shown here, the analysis of community composition and its relationship to later life outcomes has the potential to provide a better understanding of the links between spatial variation and demographic events. More research on the changing nature of links between community and fertility can only serve to develop this further.

References

- Abma, J. C., & Krivo, L. J. (1991). The Ethnic Context of Mexican American Fertility. *Sociological Perspectives*, 34(2), 145–164.
- Adserà, A., & Ferrer, A. (2014). Factors influencing the fertility choices of child immigrants in Canada. *Population Studies*, 68(1), 65–79. <http://doi.org/10.1080/00324728.2013.802007>
- Adserà, A., Ferrer, A. M., Sigle-Rushton, W., & Wilson, B. (2012). Fertility Patterns of Child Migrants Age at Migration and Ancestry in Comparative Perspective. *The ANNALS of the American Academy of Political and Social Science*, 643(1), 160–189. <http://doi.org/10.1177/0002716212444706>
- Alba, R., & Nee, V. (2005). *Remaking the American mainstream: Assimilation and contemporary immigration*. Harvard University Press.
- Andersson, G. (2004). Childbearing after Migration: Fertility Patterns of Foreign-born Women in Sweden. *International Migration Review*, 38(2), 747–774.
- Bachrach, C. A. (2013). Culture and Demography: From Reluctant Bedfellows to Committed Partners. *Demography*. <http://doi.org/10.1007/s13524-013-0257-6>
- Bean, F. D., & Swicegood, G. (1985). *Mexican American fertility patterns*. University of Texas Press Austin.
- Blackwell, L., Lynch, K., Smith, J., & Goldblatt, P. (2003). *Longitudinal study 1971-2001: completeness of census linkage*. London: Office for National Statistics. Retrieved from <http://www.census2001.gov.uk/downloads/theme-population/LS-no.10.pdf>
- Bongaarts, J. (1978). A Framework for Analyzing the Proximate Determinants of Fertility. *Population and Development Review*, 4(1), 105–132. <http://doi.org/10.2307/1972149>
- Brewster, K. L. (1994). Neighborhood context and the transition to sexual activity among young black women. *Demography*, 31(4), 603–614. <http://doi.org/10.2307/2061794>
- Brewster, K. L., Billy, J. O. G., & Grady, W. R. (1993). Social Context and Adolescent Behavior: The Impact of Community on the Transition to Sexual Activity. *Social Forces*, 71(3), 713–740. <http://doi.org/10.2307/2579892>
- Burgess, E. W. (1928). Residential Segregation in American Cities. *Annals of the American Academy of Political and Social Science*, 140, 105–115.
- CeLSIUS. (2014). Centre for Longitudinal Study Information and User Support. Retrieved January 2, 2014, from <http://www.ucl.ac.uk/celsius>
- Cleland, J., & Wilson, C. (1987). Demand Theories of the Fertility Transition: An Iconoclastic View. *Population Studies*, 41(1), 5–30. <http://doi.org/10.1080/0032472031000142516>
- Coleman, D. A. (1994). Trends in fertility and intermarriage among immigrant populations in Western Europe as measures of integration. *Journal of Biosocial Science*, 26(01), 107–136.
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64, 19–41. <http://doi.org/10.1080/00324720903391201>
- Dale, A., Creaser, R., Dodgeon, B., Gleave, S., & Filakti, H. (1993). An introduction to the OPCS Longitudinal Study. *Environment and Planning A*, 25(10), 1387 – 1398. <http://doi.org/10.1068/a251387>
- Davis, K., & Blake, J. (1956). Social Structure and Fertility: An Analytic Framework. *Economic Development and Cultural Change*, 4(3), 211–235.
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>

- Dubuc, S., & Haskey, J. (2010). Ethnicity and Fertility in the United Kingdom. In J. Stillwell & M. Ham (Eds.), *Ethnicity and Integration* (pp. 63–81). Dordrecht: Springer Netherlands. Retrieved from <http://www.springerlink.com.gate2.library.lse.ac.uk/content/x75262030127783t/>
- Duncan, O. D., & Lieberman, S. (1959). Ethnic segregation and assimilation. *American Journal of Sociology*, 64(4), 364–374.
- Fernández, R., & Fogli, A. (2009). Culture: An Empirical Investigation of Beliefs, Work, and Fertility. *American Economic Journal: Macroeconomics*, 1(1), 146–177. <http://doi.org/10.1257/mac.1.1.146>
- Findley, S. E. (1980). A suggested framework for analysis of urban-rural fertility differentials with an illustration of the Tanzanian case. *Population and Environment*, 3(3–4), 237–261. <http://doi.org/10.1007/BF01255341>
- Fischer, N. A., & Marcum, J. P. (1984). Ethnic Integration, Socioeconomic Status, and Fertility Among Mexican Americans. *Social Science Quarterly* (University of Texas Press), 65(2), 583–593.
- Flowerdew, R. (2011). How serious is the Modifiable Areal Unit Problem for analysis of English census data? *Population Trends*, (145), 102–14.
- Ford, K. (1990). Duration of Residence in the United States and the Fertility of US Immigrants. *International Migration Review*, 24(1), 34–68.
- Forste, R., & Tienda, M. (1996). What's Behind Racial and Ethnic Fertility Differentials? *Population and Development Review*, 22, 109–133. <http://doi.org/10.2307/2808008>
- Fricke, T. (2003). Culture and Causality: An Anthropological Comment. *Population and Development Review*, 29(3), 470–479. <http://doi.org/10.1111/j.1728-4457.2003.00470.x>
- Gjerde, J., & McCants, A. (1995). Fertility, marriage, and culture: Demographic processes among Norwegian immigrants to the rural middle west. *The Journal of Economic History*, 55(04), 860–888.
- Goldberg, D. (1959). The Fertility of Two-Generation Urbanites. *Population Studies*, 12(3), 214–222. <http://doi.org/10.2307/2171971>
- Goldberg, D. (1960). Another Look at the Indianapolis Fertility Data. *The Milbank Memorial Fund Quarterly*, 38(1), 23–36. <http://doi.org/10.2307/3348618>
- Goldscheider, C., & Uhlenberg, P. R. (1969). Minority Group Status and Fertility. *American Journal of Sociology*, 74(4), 361–372.
- Goldstein, H. (1999). *Multilevel statistical models*. Retrieved from http://www.ats.ucla.edu/stat/examples/msm_goldstein/goldstein.pdf
- Gordon, M. M. (1964). *Assimilation in American life: The role of race, religion, and national origins*. Oxford University Press, USA.
- Gurak, D. T. (1980). Assimilation and fertility: A comparison of Mexican American and Japanese American women. *Hispanic Journal of Behavioral Sciences*.
- Hammel, E. A. (1990). A Theory of Culture for Demography. *Population and Development Review*, 16(3), 455–485. <http://doi.org/10.2307/1972832>
- Hattersley, L. (1999). *LS User Guide 18: International migration data in the Longitudinal Study*.
- Hattersley, L., & Creaser, R. (1995). *Longitudinal study 1971–1991: history, organisation and quality of data*. London: Office of Population Censuses and Surveys, H.M.S.O.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.

- Hervitz, H. M. (1985). Selectivity, adaptation, or disruption? A comparison of alternative hypotheses on the effects of migration on fertility: The case of Brazil. *International Migration Review*, 19(2), 293–317.
- Hewstone, M. (2009). *Living Apart, Living Together?: The Role of Intergroup Contact in Social Integration*. Max Planck Institute for the Study of Religious and Ethnic Diversity.
- Hill, J. A. (1913). Comparative Fecundity of Women of Native and Foreign Parentage in the United States. *Publications of the American Statistical Association*, 13(104), 583–604. <http://doi.org/10.2307/2965013>
- Hill, L. E., & Johnson, H. P. (2004). Fertility Changes Among Immigrants: Generations, Neighborhoods, and Personal Characteristics. *Social Science Quarterly*, 85(3), 811–827. <http://doi.org/10.1111/j.0038-4941.2004.00246.x>
- Hogan, D. P., Astone, N. M., & Kitagawa, E. M. (1985). Social and Environmental Factors Influencing Contraceptive Use Among Black Adolescents. *Family Planning Perspectives*, 17(4), 165–169. <http://doi.org/10.2307/2135241>
- Hogan, D. P., & Kitagawa, E. M. (1985). The Impact of Social Status, Family Structure, and Neighborhood on the Fertility of Black Adolescents. *American Journal of Sociology*, 90(4), 825–855.
- Johnson-Hanks, J., Bachrach, C. A., Morgan, S. P., & Kohler, H.-P. (2011). *Understanding family change and variation : toward a theory of conjunctural action*. Dordrecht; New York: Springer.
- Jones, K. (1991). Specifying and Estimating Multi-Level Models for Geographical Research. *Transactions of the Institute of British Geographers*, 16(2), 148–159. <http://doi.org/10.2307/622610>
- Kahn, J. R. (1994). Immigrant and native fertility during the 1980s: adaptation and expectations for the future. *International Migration Review*, 28(3), 501–519.
- Kennedy, R. E. (1973). Minority Group Status and Fertility: The Irish. *American Sociological Review*, 38(1), 85–96. <http://doi.org/10.2307/2094333>
- Kertzer, D. I. (1997). The proper role of culture in demographic explanation. In G. W. Jones, R. M. Douglas, J. C. Caldwell, & R. M. D'Souza (Eds.), *The Continuing Demographic Transition* (pp. 137–157). Oxford: Oxford University Press.
- Knox, P. L., & Pinch, S. (2006). *Urban social geography: an introduction*. Pearson Education.
- Kuczynski, R. R. (1901). The Fecundity of the Native and Foreign born Population in Massachusetts (I.). *The Quarterly Journal of Economics*, 16(1), 1–36. <http://doi.org/10.2307/1882901>
- Kuczynski, R. R. (1902). The Fecundity of the Native and Foreign born Population in Massachusetts (II.). *The Quarterly Journal of Economics*, 16(2), 141.
- Kulu, H. (2005). Migration and Fertility: Competing Hypotheses Re-examined. *European Journal of Population / Revue Européenne de Démographie*, 21(1), 51–87. <http://doi.org/10.1007/s10680-005-3581-8>
- Kulu, H., & Boyle, P. J. (2009). High Fertility in City Suburbs: Compositional or Contextual Effects? *European Journal of Population / Revue Européenne de Démographie*, 25(2), 157–174. <http://doi.org/10.1007/s10680-008-9163-9>
- Kulu, H., Boyle, P. J., & Andersson, G. (2009). High Suburban Fertility: Evidence from Four Northern European Countries. *Demographic Research*, 21, 915–944. <http://doi.org/10.4054/DemRes.2009.21.31>

- Kulu, H., & Washbrook, E. (2014). Residential context, migration and fertility in a modern urban society. *Advances in Life Course Research*, 21, 168–182.
<http://doi.org/10.1016/j.alcr.2014.01.001>
- La Ferrara, E., Chong, A., & Duryea, S. (2012). Soap Operas and Fertility: Evidence from Brazil. *American Economic Journal: Applied Economics*, 4(4), 1–31.
<http://doi.org/10.1257/app.4.4.1>
- Lee, E. S., & Lee, A. S. (1952). The Differential Fertility of the American Negro. *American Sociological Review*, 17(4), 437–447. <http://doi.org/10.2307/2087999>
- Lesthaeghe, R., & Surkyn, J. (1988). Cultural Dynamics and Economic Theories of Fertility Change. *Population and Development Review*, 14(1), 1–45.
<http://doi.org/10.2307/1972499>
- Lichter, D. T., Johnson, K. M., Turner, R. N., & Churilla, A. (2012). Hispanic Assimilation and Fertility in New U.S. Destinations. *International Migration Review*, 46(4), 767–791.
<http://doi.org/10.1111/imre.12000>
- Liefbroer, A. C., & Billari, F. C. (2010). Bringing norms back in: a theoretical and empirical discussion of their importance for understanding demographic behaviour. *Population, Space and Place*, 16(4), 287–305. <http://doi.org/10.1002/psp.552>
- Lopez, D. E., & Sabagh, G. (1978). Untangling structural and normative aspects of the minority status-fertility hypothesis. *American Journal of Sociology*, 83(6), 1491–1497.
- Lorimer, F. (1956). Culture and Human Fertility. *Journal of School Health*, 26(4), 136–136.
<http://doi.org/10.1111/j.1746-1561.1956.tb00823.x>
- Marin, B. V. O., Gomez, C. A., & Hearst, N. (1993). Multiple Heterosexual Partners and Condom Use among Hispanics and Non-Hispanic Whites. *Family Planning Perspectives*, 25(4), 170–174. <http://doi.org/10.2307/2135925>
- Martin, D. (2008, February 29). Census geography: England 1971 [Text]. Retrieved January 2, 2014, from <http://www.restore.ac.uk/geo-refer/31425dengs00y19711980.php>
- Massey, D. S. (1981). Dimensions of the New Immigration to the United States and the Prospects for Assimilation. *Annual Review of Sociology*, 7, 57–85.
<http://doi.org/10.1146/annurev.so.07.080181.000421>
- Massey, D. S. (1985). Ethnic residential segregation: A theoretical synthesis and empirical review. *Sociology and Social Research*, 69(3), 315–350.
- Massey, D. S., & Denton, N. A. (1985). Spatial Assimilation as a Socioeconomic Outcome. *American Sociological Review*, 50(1), 94–106. <http://doi.org/10.2307/2095343>
- Massey, D. S., & Denton, N. A. (1988). The Dimensions of Residential Segregation. *Social Forces*, 67(2), 281–315. <http://doi.org/10.1093/sf/67.2.281>
- Nauck, B. (1987). Individuelle und kontextuelle Faktoren der Kinderzahl in türkischen Migrantenfamilien. Ein Replikationsversuch bevölkerungsstatistischer Befunde durch Individualdaten. *Zeitschrift Für Bevölkerungswissenschaft*, 13(3), 319–344.
- Nauck, B. (2007). Immigrant families in Germany. Family change between situational adaptation, acculturation, segregation and remigration. *Zeitschrift Für Familienforschung*, 19(1), 34–54.
- ONS. (2014). The ONS Longitudinal Study. Retrieved January 2, 2014, from <http://www.ons.gov.uk/ons/guide-method/user-guidance/longitudinal-study/index.html>
- Openshaw, S. (1984). Ecological fallacies and the analysis of areal census data. *Environment and Planning A*, 16(1), 17 – 31. <http://doi.org/10.1068/a160017>

- Park, R. E., & Burgess, E. W. (1921). *Introduction to the Science of Sociology*. Chicago: University of Chicago Press.
- Parrado, E. A. (2011). How High is Hispanic/Mexican Fertility in the United States? Immigration and Tempo Considerations. *Demography*, 48(3), 1059–1080. <http://doi.org/10.1007/s13524-011-0045-0>
- Parrado, E. A., & Morgan, S. P. (2008). Intergenerational Fertility Among Hispanic Women: New Evidence of Immigrant Assimilation. *Demography*, 45(3), 651–671.
- Peach, C. (1996). Good segregation, bad segregation. *Planning Perspectives*, 11(4), 379–398. <http://doi.org/10.1080/026654396364817>
- Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The Annals of the American Academy of Political and Social Science*, 530(1), 74–96.
- Robards, J. (2012, June). *Estimating the fertility of recent migrants to England and Wales (1991-2001) – is there an elevated level of fertility after migration?* Presented at the European Population Conference, Stockholm University.
- Robards, J., Berrington, A., & Hinde, A. (2011). Estimating fertility rates using the ONS Longitudinal Study-what difference does the inclusion of non-continually resident members make? *Population Trends*, 144.
- Robards, J., Berrington, A., & Hinde, A. (2013). Identifying biases arising from combining census and administrative data – the fertility of migrants in the Office for National Statistics Longitudinal Study. *Longitudinal and Life Course Studies*, 4(3), 258–267.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin.
- Sigle-Rushton, W. (2008). England and Wales: Stable fertility and pronounced social status differences. *Demographic Research*, 19(15), 455–502.
- Simpson, L. (2004). Statistics of racial segregation: measures, evidence and policy. *Urban Studies*, 41(3), 661–681. <http://doi.org/10.1080/0042098042000178735>
- Simpson, L. (2007). Ghettos of the mind: the empirical behaviour of indices of segregation and diversity. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 170(2), 405–424.
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225–248. <http://doi.org/10.4054/DemRes.2008.19.9>
- Soler, H., Quadagno, D., Sly, D. F., Riehman, K. S., Eberstein, I. W., & Harrison, D. F. (2000). Relationship Dynamics, Ethnicity and Condom Use among Low-Income Women. *Family Planning Perspectives*, 32(2), 82–101. <http://doi.org/10.2307/2648216>
- Sorenson, A. M. (1988). The Fertility and Language Characteristics of Mexican-American and Non-Hispanic Husbands and Wives. *The Sociological Quarterly*, 29(1), 111–130. <http://doi.org/10.2307/4121576>
- Stephen, E. H., Rindfuss, R. R., & Bean, F. D. (1988). Racial differences in contraceptive choice: Complexity and implications. *Demography*, 25(1), 53–70. <http://doi.org/10.2307/2061477>
- Sturgis, P., Brunton-Smith, I., Kuha, J., & Jackson, J. (2014). Ethnic diversity, segregation and the social cohesion of neighbourhoods in London. *Ethnic and Racial Studies*, 37(8), 1–21. <http://doi.org/10.1080/01419870.2013.831932>
- Swicegood, G., Bean, F. D., Stephen, E. H., & Opitz, W. (1988). Language usage and Fertility in the Mexican-Origin Population of the United States. *Demography*, 25(1), 17–33. <http://doi.org/10.2307/2061475>

- Toulemon, L. (2004). Fertility among immigrant women: new data, a new approach. *Population & Societies*, 400. Retrieved from http://www.ined.fr/en/publications/pop_soc/bdd/publication/540/
- Toulemon, L. (2006). *Fertility Among Immigrant Women in France: New Data, a New Approach*. Prepared for Population Association of American 2006 Annual Meeting, Los Angeles, California, March 30-April 1, 2006.
- Toulemon, L., & Mazuy, M. (2004). *Comment prendre en compte l'âge à l'arrivée et la durée de séjour en France dans la mesure de la fécondité des immigrants?* INED. Retrieved from http://www.ined.fr/fichier/t_publication/1053/publi_pdf1_120.pdf
- UK Data Service. (2014). Casweb | UK Data Service Census Support. Retrieved January 2, 2014, from <http://casweb.mimas.ac.uk/>
- Vang, Z. M. (2012). The Limits of Spatial Assimilation for Immigrants' Full Integration: Emerging Evidence from African Immigrants in Boston and Dublin. *The ANNALS of the American Academy of Political and Social Science*, 641(1), 220–246. <http://doi.org/10.1177/0002716211432280>
- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31(1), 105–125. <http://doi.org/10.1146/annurev.soc.29.010202.100026>
- Wilson, B. (2011, August 19). *Migrant fertility in England and Wales: Measuring fertility convergence* (Masters dissertation). London School of Economics and Political Science, London.
- Yancey, W. L., Ericksen, E. P., & Juliani, R. N. (1976). Emergent Ethnicity: A Review and Reformulation. *American Sociological Review*, 41(3), 391–403. <http://doi.org/10.2307/2094249>
- Zarate, A., & Zarate, A. U. de. (1975). On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. *International Migration Review*, 9(2), 115–156.
- Zhou, M. (1997). Segmented Assimilation: Issues, Controversies, and Recent Research on the New Second Generation. *International Migration Review*, 31(4), 975–1008. <http://doi.org/10.2307/2547421>

Appendix tables

TABLE A5.1: THE ANALYTICAL SAMPLE

	N	% of all	% of sample with missing
All women under 16 in 1971	64,370		
drop scotland and n.ireland	531	0.8	
drop communals	622	1.0	
not enumerated at 2001 Census ¹	10,903	16.9	
Sample with missing values	52,314	81.3	
missing COB	128		0.2
missing age at migration	37		0.1
missing parental COB	1,440		2.8
missing address one year ago	460		0.9
foreign-born migrants who lived in a different LA one year ago	97		0.0
Total missing	2,162		4.0
Analytical sample	50,152		96.0

1: Assumed to have emigrated or died; Source: Author's analysis using Office for National Statistics Longitudinal Study data.

TABLE A5.2: DESCRIPTIVE STATISTICS BY GENERATION

	Ancestral natives	Second generation	Foreign- born child migrants
mean number of children			
maximum (own child + registered)	1.85	1.77	2.06
registered births in 2009	1.79	1.70	1.90
difference	0.06	0.07	0.15
mean age (years)			
age in 1971	7.4	7.0	9.4
parental social class in 1971 (n)			
Either parent has high SEC	17,571	1,629	355
Neither parent has high SEC	23,744	2,777	455
SEC unknown for both parents	2,853	504	264
parental social class in 1971 (%)			
Either parent has high SEC	40	33	33
Neither parent has high SEC	54	57	42
SEC unknown for both parents	6	10	25
observations (n)	44,168	4,910	1,074

Source: Author's analysis using Office for National Statistics Longitudinal Study data.

6. Conclusion

This thesis has focused on the fertility of international migrants and their descendants. The four thesis papers have asked a series of questions relating to differentials, convergence, and the heterogeneity of migrant fertility. In doing so, they have explored issues relating to fertility measurement, ancestral origins, and exposure to cultural norms. This final chapter summarises the results of the thesis as a collective enterprise. In addition to synthesising the findings, it considers their implications and their limitations, alongside some recommendations for future research.

6.1 The findings of this thesis

The starting point for developing the contribution of this thesis was a review of the literature on migrant fertility in chapter 1. As with the rest of the thesis, this review focused on the fertility of international migrants and their descendants, and it outlined a number of ways in which our current knowledge could be developed.

Building on the review, chapter 2 set out to clarify the concept of migrant fertility convergence. This paper began by establishing three different convergence concepts: (i) convergence over time, (ii) convergence over generations, and (iii) convergence over exposure to destination. Using these concepts, it then created a typology of convergence, where each type of convergence was derived from the different motivations for studying migrant fertility convergence. This allowed the paper to outline the implications of different types of convergence for empirical research, including their implications for fertility measurement and research design. In turn, this raised a number of issues that have not yet been considered by the literature. For example, the fact that fertility is distinctly different from other social process means that it may be impossible to assess adaptation for adult migrants. This is

because migrants who have given birth to more children than the native norm before arrival cannot possibly decrease their cumulative fertility after arrival, even if they alter their cultural preferences. The nature of fertility also means that many types of convergence should ideally be investigated by examining fertility differentials over the entire reproductive life course. This may not always be feasible, or even desirable, given available data or the aims of research. Nevertheless, this paper demonstrates the need for researchers to justify their methodological and measurement decisions, and to match them to the aims of their empirical research. Taken as a whole, this first paper highlights the importance of being explicit about the meaning of convergence when applied to migrant fertility.

Building on this first conceptual paper, the rest of the thesis comprised three empirical papers that each carried out a study of migrant fertility in the UK. The results of these studies were discussed separately in each of the thesis papers, but their findings are summarised here in order to demonstrate how they coalesce to form a collective contribution. Table 6.1 brings together the main findings of each of the empirical papers. In chapter 3, the second paper explored variation in migrant fertility differentials over the life course. While in chapter 4, the third paper focused on variation in completed fertility convergence over generations. Together, these studies showed that migrant fertility differentials in the UK vary considerably according to immigrant origins and ancestral country of birth. As such, these studies have demonstrated the importance of accounting for origin heterogeneity, especially when studying convergence and theoretical explanations like assimilation. The study of convergence in chapter 4 showed evidence of cultural maintenance for second generation women with Pakistani and Bangladeshi ancestry, and this was confirmed in the final paper in chapter 5. The analysis in chapter 5 investigated the role of culture as an explanation for migrant fertility differentials, and showed that exposure to cultural norms is associated with higher completed fertility differentials, in particular for immigrants and their descendants from South Asia.

Table 6.1: Summary of findings relating to migrant fertility in the UK

<i>Chapter 3 - Understanding how immigrant fertility differentials vary over the reproductive life course</i>
<ul style="list-style-type: none"> Comparing foreign-born immigrants and UK-born natives, aggregate completed fertility differentials are much smaller than period TFR differentials. On average, UK immigrants have fewer children than natives in the first half of their reproductive life course, but many experience a period of elevated fertility after migration and eventually 'catch up' to native levels. Migrant fertility differentials are not constant over the reproductive life course, and the relationship between the quantum and tempo of migrant fertility shows considerable variation by age at migration and country of birth. Compared with UK-born natives, the greatest variations in fertility differentials across the life course are for Jamaican-born and Bangladeshi-born women - the cumulative fertility of Jamaican immigrants is more than twice that of natives at age 20, but by age 40 this differential has almost disappeared. Despite very different profiles, the completed fertility differentials of Bangladeshis and Pakistanis are almost the same, showing a higher level of completed fertility than natives. Higher fertility across the life course for child migrants from these groups suggests that fertility may be culturally entrenched.
<i>Chapter 4 - Intergenerational assimilation of completed fertility: Comparing the convergence of different origin groups</i>
<ul style="list-style-type: none"> There is evidence of intergenerational assimilation (and also childhood socialisation) for immigrants and their descendants from Ireland and Jamaica. Second generation women from Pakistan and Bangladesh have a smaller differential than the first generation, but both generations have significantly higher completed fertility than natives, a result which provides evidence in support of the cultural entrenchment hypothesis. For immigrants and their descendants from North Africa and the Middle East there is some evidence of divergence from the native norm. Most conclusions remain unchanged after controlling for social characteristics (education and partnership history), although these characteristics are important for explaining the fertility of second generation Western and Central Africans.
<i>Chapter 5 - What is the influence of childhood exposure to cultural norms? The role of segregation and community composition in explaining migrant fertility</i>
<ul style="list-style-type: none"> There is evidence in support of childhood socialisation, which suggests that migrant fertility is closer to native fertility for migrants who grow up in areas with a more dominant native community culture. Exposure to native norms is associated with a lower completed fertility for first generation Indians and first and second generation Pakistanis/Bangladeshis. Exposure to cultural norms may explain the cultural entrenchment of fertility for second generation women from Pakistan and Bangladesh, the only second generation group to have significantly higher completed fertility than natives. The same conclusions are reached when using different measures of normative exposure - i.e. using different measures of community population composition.

6.2 Interpreting the findings

6.2.1 Implications for the study of migrant fertility

This thesis has stressed the need for research on migrant fertility to consider the links between theories, concepts, measures, and methods. By considering the implications of each of these research components, and making their links explicit, it has argued that new research will be better equipped to describe and explain migrant fertility differentials. In addition to the specific findings of each paper, the papers also make a collective contribution, and there are a number of links between them when viewed as a whole. The findings of all three empirical papers point toward the cultural entrenchment of Bangladeshi and Pakistani fertility in the UK. As discussed in the papers, this aligns with the results of previous research that has used period TFRs to measure fertility (Coleman & Dubuc, 2010; Dubuc, 2012), but the results of this thesis show a series of new results for these two origin groups, including that they are more likely than other origin groups to have a higher completed fertility than natives. This can be contrasted with evidence of childhood socialisation for Irish and Jamaican women. The completed fertility of second generation women from these two origins has converged toward the UK-native norm, which in turn provides evidence in support of intergenerational assimilation.

There are a variety of potential explanations for differences between origin groups. However, chapter 3 suggests that earlier birth timing does not necessarily lead to a higher completed fertility for immigrants as compared with natives. In the early childbearing years, there is more similarity between Bangladeshi and Jamaican immigrants in their patterns of differentials than there is between Bangladeshis and Pakistanis, and yet the opposite is true for completed fertility.

Patterns of first generation fertility might be explained by selection, and therefore linked to the changing patterns of origin fertility, as well as global demographic convergence. However, these explanations are less relevant for the second generation, who are born in the destination. Instead, it may be that assimilation, or a lack of assimilation, for the second generation is most plausibly explained by the role of culture and the adoption of native fertility norms. The results of chapter 5 highlight the potential role of exposure to childhood cultural norms in explaining variation in completed fertility differentials. There are alternative explanations for these results. For example, they could be explained by the geographical selection of immigrant parents. In addition, it may be that the mechanism for assimilation is a form of adaptation to society and societal norms. Nevertheless, when viewed as a whole the findings of this thesis indicate the potential importance of culture and cultural exposure, which is certainly something that could be investigated by further research.

The findings also make a collective contribution in a broader sense. For example, the three empirical papers demonstrate that understanding origin heterogeneity is likely to be a crucial component of understanding migrant fertility in any context. Similarly, the results suggest researchers should be cautious when attempting to generalise from one origin group to another, whether it be in relation to life course differentials, convergence across generations, or exposure to destination norms. In each of the empirical papers, this thesis demonstrates the benefits of comparing origin groups in the same destination, using the same study design, thereby allowing a more reliable comparison than may be possible using studies that focus on individual origin groups. By studying all origin groups in the UK, and making use of a suitable method, the results also provide a picture of migrant fertility that is representative of the population, and may therefore prove useful for researchers (and research users) who hope to gain an overview of migrant fertility in the UK.

The academic implications of this thesis reach beyond the UK, and it can be argued that the findings show how new knowledge about migrant fertility can be developed in any context by:

- ~ clarifying the concepts that underpin research on migrant fertility, and considering the implications of these concepts for the design of research; *(the focus of chapter 2, but also discussed in chapters 3, 4, and 5)*
- ~ understanding the importance of taking a life course approach to fertility when studying the childbearing of immigrants and their descendants; *(discussed in chapter 2, and the focus of chapter 3)*
- ~ comparing and contrasting migrants from different origin and ancestry groups; *(the focus of chapters 3 and 4, and a part of chapter 5)*
- ~ and testing migrant fertility hypotheses using appropriate methods in order to help explain patterns of migrant fertility behaviour *(as in chapters 4 and 5)*

6.2.2 Policy implications

Studies of migrant fertility are usually motivated by an interest in the contribution of migrants to population dynamics, or concern about the integration and assimilation of migrants in their destination societies. In response to these motivations, previous research has set out to describe and explain the differences between migrant fertility and the fertility of the mainstream population, including how these differences change over time or across generations.

It follows that one chief concern for policy-makers has been whether there is a difference between the fertility of immigrants and natives at the national level. This thesis shows that there is only a minimal difference with regard to completed fertility in the UK, which is the measure that most accurately describes the lifetime contribution of fertility to population size. It

also confirms the conclusion of previous research that the period TFR may be an inaccurate measure in order to evaluate this contribution.

Migrant fertility relates to a number of policy areas, and has been of increasing interest to policy-makers in the UK, not least because of high levels of net migration over the last two decades (BBC, 2008, 2013). Foreign-born women are often promoted as an explanation for rising fertility and population growth, and this view is reflected in the UK media (Allen & Warrell, 2013; Hall, 2014; Mason, 2012; The Telegraph, 2010). Similarly, judging by debates in Parliament, migrant fertility is also in the minds of politicians as well (House of Lords, 2015). In the opinion of one senior politician in 2008: *"With births to foreign mothers becoming such a large driver of population growth, it is vital that immigration levels are set taking into account the ability of our schools, hospitals and other local services to cope"* (shadow home secretary Dominic Grieve, quoted in: BBC, 2008).

What this thesis shows is that the impact of migrant fertility is less likely to relate to the average fertility rates of immigrants and their descendants, than the number of women who migrate and the composition of the population by origin and ancestry. The findings of this thesis imply that the heterogeneity of migrant fertility is a crucial consideration when trying to predict the impact of migrant fertility on 'schools, hospitals and other local services'. The link between birth timing and the timing of migration is a valuable insight here, alongside the knowledge that immigrants tend to have more births than natives in the second half of their reproductive lives, (what some have referred to as 'elevated' fertility). One policy implication is that data on newly arriving immigrant women could be used to more accurately predict the level and impact of migrant births. The fact that migrant fertility differentials vary so much over the life course by country of birth is similarly important, not least because there is considerable variation in the distribution of immigrant origin groups across the different regions and sub-regions of the UK (e.g. ONS, 2012).

Policy-makers are also interested in the long-run impact of migrants on destination populations. In this regard, their concerns have typically focused on issues relating to low fertility or population ageing, and their implications for labour supply, health, and pensions (Christensen, Doblhammer, Rau, & Vaupel, 2009; Grant et al., 2004; Harper & Hamblin, 2014). In addition to impacts on population dynamics relating to the number of immigrants who settle in a destination, the fertility of immigrants and their descendants has the potential to impact destination populations long into the future, both in terms of population size and composition. In turn, these issues are firmly related to generational convergence, which shows how migrant fertility differentials are changing over time and generations. The results of this thesis show that patterns of generational convergence are not the same for the completed fertility of different ancestral origin groups. As a result, this highlights the groups that are more or less likely to have a sustained impact on population size. For example, second generation Pakistanis have significantly higher completed fertility than ancestral natives, suggesting that they may be an important group for policy-makers to consider in relation to increasing population size. The same appears to be true for second generation Bangladeshis, (although they often have small samples in the analysis that is carried out here, and therefore should be treated with more caution). In addition to population size, these differences in generational convergence are important to policy-makers because they indicate the future composition of the population, most notably by country of birth and ethnicity. They also provide suggestive evidence about the likely evolution of the third generation.

This thesis also shows that there is evidence of 'fertility divergence' for some groups, most notably women with ancestral origins from North Africa or the Middle East. Second generation women from these origins have significantly lower completed fertility than ancestral natives, so these groups may be of interest if policy-makers wish to know which migrant groups are likely to make less of a contribution to population size than ancestral natives. Similarly, there is a notable pattern of 'negative differentials' early in the life

course for immigrants from some origins, including those from high income countries. Of note here is the life course fertility of immigrants from South and East Europe because both child migrants and adult migrants exhibit delayed early childbearing as compared with natives.

As well as policies relating to population dynamics, this thesis has implications for policies relating to integration. UK policies concerning integration have varied since their introduction in the 1960s, and have developed over time so that they now focus on citizenship, community cohesion, discrimination, and equality (Spencer, 2011). The results of the empirical papers have some implications for integration policies. One of these relates to the patterns of elevated fertility that were shown in chapter 3, which suggest that migrant births are more likely when they have recently arrived in the UK. These migrants presumably have less knowledge and experience of living in the UK than other migrants, which implies that they will have had less time to integrate. However, the process of giving birth and raising a child in the UK is likely to involve an interaction with many different public services, and this period may present an excellent opportunity for policy intervention with regard to integration.

Also related to integration is the role of culture in society, which has most commonly been discussed and debated in the UK, in the last few decades at least, with regard to multiculturalism (BBC, 2011; Heath & Demireva, 2014; Parekh, 2000). Although the findings do not suggest any direct policy recommendations in relation to this, the empirical papers contribute to the body of evidence that evaluates the role of cultural differences in UK society. For example, chapter 4 provides evidence in support of childhood socialisation for Irish and Jamaican generations and cultural entrenchment for Pakistani and Bangladeshi generations (in relation to completed fertility). In line with the theoretical foundations of these hypotheses, the findings suggest that the role of cultural norms is important for understanding the demographic behaviour of migrant generations in the UK. This conclusion is reinforced considerably by

the findings of chapter 5, which also suggest that community culture, including residential segregation, is a mechanism for the influence of cultural norms. Although geographical concentration is only one (somewhat indirect) dimension of cultural variation, and there is certainly more research needed to clarify these results, these findings at least represent the development of new understanding about the relationship between culture and fertility in the UK.

In addition to the above, the findings also have some relevance for policy-makers outside the UK. For example, there has been an increasing interest among EU policy-makers in the second generation (Crul & Vermeulen, 2003; European Commission, 2011; Haug, Compton, & Courbage, 2002). In part this is driven by the interests discussed above, such as concerns about integration or population dynamics. But there is also a policy interest in comparing the behaviour of migrant groups across Europe. Previous comparative studies of European migrant fertility have been restricted in the extent to which they can compare and contrast the fertility of migrants from different origins (Sobotka, 2008). As such, this study contributes toward a growing evidence base for European comparative demography, and in this sense they also respond to the recommendations of recent research (Kulu & González-Ferrer, 2014).

6.3 Limitations

As discussed throughout this thesis, there are a number of reasons why the findings should be treated with caution. Rather than repeat the specific limitations that are discussed in the four papers, this section discusses some of those that apply more generally.

Some limitations of this thesis relate to its use of concepts, definitions, and hypotheses. Despite the efforts of this thesis to carefully define convergence and consider the implications of different definitions, it is important to note that some of the concepts relating to convergence could be further elaborated. For

example, convergence may be conceptualised as the narrowing of a difference between (a) the fertility of immigrants or their descendants, and (b) the mainstream fertility norm. However, the mainstream norm can be conceptualised (and measured) in different ways. As mentioned in chapter 2 (section 2.3.3), the mainstream norm could refer to a population or group that does not include ancestral natives. Instead, it may refer to the norm for ethnic groups or migrant generations who are assumed to have assimilated. In addition, the mainstream norm may vary according to characteristics of the immigrant group under investigation, (and this is irrespective of the inclusion or exclusion of natives in its definition). This is an important consideration, for example, if some migrant groups are assimilating toward the fertility norm of a mainstream population with similar socio-economic characteristics (e.g. the same social class).

Although it could be made more explicit, the fact that the mainstream norm may vary for different migrant groups is actually addressed (in part) in chapter 5. In particular, the use of a multilevel model (with an area-level random effect) implies that a comparison is made between (a) immigrants or their descendants who live in a given area in childhood, and (b) the mainstream norm for ancestral natives who spent their childhood living in the same area (in this case, local authority). In other words, the models in chapter 5 provide estimates of birth risks for migrants (as compared to ancestral natives), holding constant everything else in the model (where the model includes a term for the area-level fertility norm). In Table 5.3, this means that the area rank for different migrant groups is compared with ancestral natives who lived in the same area in 1971, and have the same age and parental social class in 1971. Despite the benefits of this approach for meeting the aims of the research in chapter 5, this is clearly not the same as comparing to the national average fertility for ancestral natives, as in the other chapters. This limitation means that the findings are not directly comparable across all chapters.

Another limitation relating to the mainstream norm is that it is not constant, either over time (year on year), across cohorts, or over the life course. This issue places limits on the extent to which findings can be interpreted as the result of changes in the behaviour of immigrants and their descendants. For example, convergence may be due (in part) to changes in mainstream (or native) fertility, even when the fertility of immigrants and their descendants is also changing.

Related to the limitations of this thesis with respect to the 'mainstream norm', there are also limitations associated with its treatment of the concept of 'culture'. As described in the introduction (section 1.3.3), many of the theories and hypotheses that have been developed to explain migrant fertility make reference to culture and cultural norms. However, in discussing these theories and hypotheses, this thesis often makes assumptions about the concept of culture without challenging their implications. For example, the discussion of theories and hypotheses in the introduction sometimes takes culture at face value, without recognising that it can refer to many different factors, and many different mechanisms that may affect fertility. In addition, it is important to recognise, especially when interpreting the findings, that potential sources of cultural influence are many and varied. Among other things, culture may refer to family systems, institutional factors, or broader (transnational) links with other social actors. Chapter 5 makes some effort to describe the issues that relate to the study of culture and fertility, particularly with respect to area-based exposure to cultural norms. However, it is clear that not all aspects of culture are area-based, and there are many aspects of cultural variation that are not investigated in this thesis.

Even when considering culture in a narrow sense (as in chapter 5), the concept is far from straightforward. Among other things, this complexity has implications for the ways in which culture is measured. For example, one limitation of this thesis is the geographical unit of analysis that is used to measure area-based exposure to cultural norms. This choice of area is important

because it impacts the analysis and the interpretation of the findings. Chapter 5 uses 'local authority' for all of its models (in addition to 'ward' for the calculation of segregation), and there were almost 1,400 local authorities in England and Wales in 1971. However, there are several problems with this choice, including the fact that not all local authorities are similar in terms of size. Although the average population size of a local authority in 1971 was slightly less than 40,000 people, the standard deviation of population size was approximately 63,000, implying a large amount of variation. Indeed, 25 local authorities had a population of more than 250,000. Likewise, local authorities vary in terms of their spatial size and the extent to which they are urban or rural. Although there is very little that can be done to ameliorate these issues in chapter 5 (without using a different data source), it is important to acknowledge the limits that they place on the results. Even if immigrants and their descendants are matched to the mainstream norm in their childhood area, the findings are limited by the lack of comparability of different areas (for example because of differences between areas in the spatial extent of exposure to cultural norms).

In addition to the conceptualisation and measurement of culture, this thesis has limitations that relate to the hypotheses that are tested and used to explain migrant fertility, (many of which use culture as a foundational concept). For example, this thesis makes many references to the hypotheses of childhood socialisation and cultural entrenchment, but it does not subject them to the same level of scrutiny as the concept of convergence (which is critically evaluated in chapter 2). In chapter 3, the discussion of these hypotheses is brief, and although the results are interpreted cautiously, several ambiguities remain. On its own, the absence of fertility differentials for child migrants is not enough to demonstrate childhood socialisation. For example, the differentials for child migrants might be explained by their experiences during adulthood. More generally, one obvious limitation throughout this thesis is that the findings which are attributed to childhood socialisation might be explained by a number of different factors. This includes factors that offer different explanations for

socialisation, such as exposure to familial culture versus exposure to area-based culture. But it also includes factors that offer alternative explanations for the same evidence. For example, chapter 4 finds evidence in support of childhood socialisation for second generation women with Irish ancestry, but this might be due to the decline of fertility (norms) in Ireland, rather than socialisation. Similar limitations also apply to cultural entrenchment, such that evidence of entrenchment, as obtained in this thesis, might be explained by a range of different mechanisms. As discussed in the next section (6.4), this has implications for the design of future research.

The analysis in chapters 4 and 5 raises another limitation of this thesis with respect to these hypotheses. In both chapters, the second generation are defined as native-born women with one or more foreign-born parent, but this implies two groups of people who are classed as the second generation. There are strong reasons to suspect that one of these groups (those with one native- and one foreign-born parent) are more likely to be exposed to native culture than the other, (namely those with two foreign-born parents). In other words, those with two foreign-born parents may be less likely to be exposed to UK social norms, thereby making them less likely to experience 'socialisation' and more likely to experience 'entrenchment'. The results of this thesis therefore need to be interpreted with this limitation in mind.

Some other limitations relate to the data that has been used. Chapters 3 and 4 use data from wave 1 of Understanding Society (UKHLS). This is a large sample survey that is representative of the UK household population. One limitation of these data is the fact that they do not represent the whole population of the UK, essentially because they exclude people who are not living in households. The majority of the non-household population are usually resident in communal establishments, like care homes, hospitals, prisons, army barracks, boarding schools and student halls of residence. As such, they are less likely to be at risk of childbearing than the household population because they are less likely to be female (e.g. prisoners and members of the armed services),

or less likely to be of childbearing age (e.g. residents of care homes). This suggests that the exclusion of communal establishments may have a limited effect on the results of this thesis, although there is no direct evidence to support this assumption.

Perhaps a more important limitation of this data source is that data collection only began in 2009, and this means that the majority of data used in the analysis is collected retrospectively (Buck & McFall, 2011; Lynn, 2009). One implication of this is that live births may be inaccurately recorded. Research on the (British) General Household Survey fertility histories shows evidence of an over-reporting of childlessness in UK fertility histories, particularly in recent years and at older ages (Murphy, 2009). Interestingly, follow-up research suggests that the main cause of this error were a series of changes in survey procedures, and that information about resident own-children can be used to correct for this error (Ní Bhrolcháin, Beaujouan, & Murphy, 2011). It is therefore noteworthy that this thesis used information on own-children to correct the UKHLS fertility histories, generally giving primacy to (current) household membership information.

The UKHLS data that is used here is only representative of the household population in 2009/10 (Buck & McFall, 2011; Lynn, 2009; Lynn & Kaminska, 2010). As such, the sample includes only those people who were alive and resident in the UK at the time of survey, which means that the analysis excludes women who have died or emigrated from the UK prior to the survey date. It follows that the migrant population under consideration here constitutes those migrants who remain resident in the UK after arrival (where arrival year, and arrival age, vary by individual).

In some cases, it might be desirable to make inferences beyond this retrospective population, and consider the (historic) population of migrants who ever arrived. Here, it is important to note that the percentage of foreign-born migrants who emigrate (and leave the UK) within five years of arrival may be as high as 46% (Rendall & Ball, 2004). This figure is substantially lower for

migrants from lower income origin countries, for example it is only 15% for those from South Asia. However, even these low percentages represent a considerable number of people, and it is likely that they are a select group with different characteristics (and perhaps different fertility) from those who remain. This suggests that the findings should not be used to make inferences about prospective patterns of historical migrant fertility in the UK. As noted by recent research: *“the omission of information on individuals who had emigrated or died, as the situation would be in any demographic survey, most often have negligible effects on fertility measures”* (Andersson & Sobolev, 2013, p. 345). However, the same research suggests that there may be considerable differences between prospective and retrospective data when analysing immigrant fertility. Although this is for a different context (Sweden), it nonetheless suggests a potential limit to the findings.

In addition to the UKHLS data, this thesis uses data from the ONS Longitudinal Study (in chapter 5). This source does include individuals who are resident in communal establishments. However, they have been removed from the analysis, primarily to ensure that results are more comparable across the thesis papers. This means that the results in chapter 5 also suffer from the same limitations that were discussed above for the UKHLS. Another limitation of the LS data is the categories that are available for grouping country of birth and parental country of birth. Unfortunately, because these are based on classifications that were used in the 1971 Census, they are less than ideal. In particular, they make reference to Commonwealth groupings, and the groups often include a large number of heterogeneous countries in one category. In addition, data are not available at a lower level of categorisation, or by individual country, with which to be recoded. This limit is particularly applicable to the aggregate data that are used to measure community population composition, and this in turn constrains the analysis.

There are also some potential limitations of the LS data in relation to the analysis of fertility, in particular migrant fertility. The LS data on registered

births may underestimate the lifetime fertility of immigrants because they only include births in England and Wales, and not children born abroad, (e.g. before migration) (Hattersley, 1999; Robards, Berrington, & Hinde, 2011, 2013). This is less likely to be an issue in this thesis (chapter 5), which focused on child immigrants who arrived before age 16. Nevertheless, their completed fertility was calculated using the maximal method, which includes all own-children living in the same household, at all linked censuses between 1971 and 2001, as well as all registered births from 1971 onwards.

The LS and UKHLS have other limitations, including those relating to: (a) missing data and (b) their lack of additional variables that would be useful for analysis. Tables of missing data are provided throughout the thesis, and in general there is no evidence to suggest that missing data will make a difference to the results. For example, the number of cases with missing values for important variables is often small, and although it was considered, the use of multiple-imputation was not deemed to be likely to offer additional insights for the analysis. In relation to unavailability of variables, it can be argued that this is only a limitation with respect to alternative data sources. As discussed in the introduction, there are no suitable alternative UK data sources for the study undertaken here. Nonetheless, the LS data do not include any cultural measures except for ethnicity, (parental) country of birth, and community composition (which is derived using area-level indicators). The UKHLS data are the same, and do not include time-varying data on cultural measures recorded retrospectively. In general, there is a limited availability of time-varying covariates in both data sources, and a lack of useful information on migration history prior to arrival (the UKHLS includes some migration history, but only for a limited subsample of respondents).

Other limitations of this thesis relate to reliability and validity. Chapter 5 discusses the reliability and validity of cultural measures, and argues that the use of multiple measures of community population composition improves the analysis in respect of both of these concepts. Nevertheless, it should be noted

that the analysis in all of the empirical papers may be limited by the reliability and validity of the measures that are used. With respect to fertility measurement, this relates to the accuracy of recorded histories (as discussed above), but also the accuracy of household relationship information that is used to calculate own-children. This information is recorded in the form of a 'relationship grid' or 'relationship matrix', either during the survey (UKHLS) or census (LS). There is very little research on the accuracy of household relationships in relation to these data sources, although evidence for the 2001 Census (which forms part of the LS) suggests that parent-child relationships may be more reliable than other relationship dyads (Smallwood & Duke-Williams, 2006).

It is also possible to question the reliability of some of the other variables which are fundamental for the analysis in this thesis. For example, country of birth may be incorrect, either for the individuals in the analysis, or perhaps more likely for their parents (as used to derive second generation status). Related to this, another limitation of the findings might relate to the validity of empirical measures. In particular, it is possible to question the construct validity of country of birth as a measure of ancestry, and spatial population composition as a measure of exposure to cultural norms. Each of these concerns could be the subject of further investigation.

As well as limitations associated with the data, there are limitations relating to the methods that are used in the empirical papers. These include the fact that the analysis is arguably less timely because it focuses on completed fertility. In this sense, the results should be treated with caution when generalised to the behaviour of migrant women in the UK who have yet to complete their childbearing.

In chapter 3, the analysis of immigrant life course differentials does not focus on the factors that might have affected these differentials, including changes to immigration policies or period factors like recessions. Again, this should be borne in mind when generalising these fertility patterns across time.

Finally, despite all efforts to be cautious in the interpretation of results, it should be noted that individual tests of significance should not, on their own, be interpreted too definitively. There are numerous sources of uncertainty that relate to the results, and this includes the limitations relating to sample size, as well as variation due to chance.

6.4 Future research and data collection

Throughout this thesis, the individual papers have made a number of recommendations for future research, and many of these have already been summarised in this conclusion.

One avenue for future research is to respond directly to the limitations of this thesis, including those that were discussed in the previous section (6.3). For example, research could investigate the extent to which conclusions about convergence (or migrant fertility differentials) depend upon the way that the ‘mainstream norm’ is conceptualised. This includes whether findings change if the mainstream norm refers to a subgroup of ancestral natives, rather than an average for the whole population. For this, it would be useful to build upon the findings in chapters 4 and 5, and the limited ways in which they vary the mainstream norm. In particular, research might investigate what happens when you do more than control for a small number of social characteristics (i.e. vary the norm for a wider range of subgroups than in chapter 4). New research could also carry out more detailed investigations of changes to the measurement of area-based norms. This research could go beyond the comparison of different outcomes (as in chapter 5), and include an investigation of different types of area, including areas (and area-based definitions) that vary in terms of size. As discussed in the previous section, the mainstream norm can also refer to a group other than ancestral natives, for example migrant generations who are assumed to have assimilated. New research could investigate the impact of using a non-native group as the mainstream norm, including the impact of varying a non-native norm to match subgroups of migrants to subgroups of

non-natives. Prior to doing so, it would be useful to carry out some qualitative research in order to establish which groups are most likely to be the source of 'mainstream' norms for different groups of migrants.

As highlighted in the previous section, if the fertility of two groups converges, then this might be due to changes in the fertility of either group. When convergence is assessed by comparing migrant fertility against the mainstream norm (or the average fertility of a group of natives), then it follows that changes in the mainstream norm might be (at least partly) responsible for convergence. Given that this limitation applies to much of the literature on migrant fertility, including the research in this thesis, it would be useful for future research to consider this issue. Such research would help to establish the extent to which evidence of convergence is either due to migrant fertility behaviour or due to changes in the mainstream norm. In addition, it would be interesting to explore whether this issue is of greater relevance (or more problematic) in settings where fertility norms have been less stable over time.

There are also reasons to be cautious about the conclusions of this thesis with respect to evidence for or against different hypotheses. For example, evidence in support of childhood socialisation might be explained by a range of competing explanations. Future research would therefore benefit from making these competing explanations explicit, and including data that allows their comparison. As suggested in section 6.3, one example might be to compare exposure to familial culture versus exposure to area-based culture, as two different explanations for childhood socialisation. In order to move the literature beyond broad comparisons of hypotheses, it is also important to investigate the mechanisms that underpin each of the hypotheses (where exposure to area-based norms is just one mechanism for socialisation). Future research could make these mechanisms explicit and then study them in more detail. In doing so, this would also highlight the need for new forms of data.

One way that research can develop a greater understanding of the mechanisms that underpin migrant fertility behaviour is to be more critical of

the concept of culture. On the one hand, chapter 5 demonstrates that culture can be investigated as an explanation for migrant fertility. But on the other hand, it also demonstrates many of the complexities (and assumptions) that are associated with research on culture and fertility. Future research might respond to this issue in a number of ways. More research is required to develop a nuanced understanding of the many ways that culture is linked to the fertility behaviour of immigrants (and their descendants). In addition to conceptualising culture, and its relationship to existing migrant fertility theories, research is also required in order to establish the ways in which culture can be reliably and validly measured, not only in general, but also in a way that is relevant for research on childbearing over the life course.

At the same time as paying greater attention to culture, and making broader use of cultural measures, future research would also benefit from paying greater attention to explanations that are either unrelated or indirectly related to culture. As discussed in chapter 3, for example, the pattern of fertility differentials for female Bangladeshi immigrants might relate to partnership behaviour or family reunification. In this example, research might investigate these explanations by comparing the partnership behaviour of different migrant groups, alongside their fertility, while also being careful to navigate the methodological complexities that this implies (e.g. complexities due to reverse causality or anticipatory analysis). Indeed, this example from chapter 3 is not the only reason why it would be useful for research to focus on the partnership behaviour of immigrants (and their descendants), at the same time as their fertility. Partnership behaviour is one of the most important explanations for fertility behaviour in general, and it is also an essential part of most theories and hypotheses relating to migrant fertility (and not just the 'family formation hypothesis'). For example, a migrant's partner is likely to influence their fertility decision-making across the life course. In addition, partnership behaviour will influence a range of assimilation outcomes, like language acquisition, where migrants live, and how they are exposed to cultural norms (in adulthood). Future research would therefore benefit from designing studies that allow a

more complete examination of how migrant partnership influences migrant fertility over the life course, (beyond merely controlling for partnership status). Another way that the role of partnership can be better understood would be if research included more examination of the role of partner's characteristics, to the extent to which data are available.

As the limits of this thesis show, it is not just important to think about partner's characteristics, but a range of other factors. This might be done by using a more nuanced analysis. For example, future research could go beyond this thesis (in chapters 4 and 5) and carry out separate analysis of different second generation groups, according to whether they have one or two foreign-born parent. This would also avoid some of the limitations of this thesis (discussed in section 6.3). In addition to isolating particular groups of immigrants and their descendants, future research could also build on this thesis by studying how other life course processes relate to migrant fertility. This includes partnership (as discussed above), but also education, employment, and living arrangements. In doing so, it would be useful for research to consider how each of these life course processes relate to culture, assimilation, socialisation, entrenchment, or other theoretical concepts that are used to study migrant fertility.

Considering the UK, the empirical papers suggest potential directions that might be taken in order to further explain their findings. For example, it remains to be explained why the fertility of UK immigrants is elevated after arrival. Plausible explanations are provided by hypotheses like disruption, selection and anticipation, so it would be useful for research to investigate these hypotheses in the UK context. Research would also be of benefit if it investigated the underlying explanations behind these hypotheses. For example, disruption might be explained by migration induced stress, delayed partnership, separation of partners, or the avoidance of migration during pregnancy. As such, future research might try to isolate and test these different explanations.

The papers show distinct patterns of fertility for different migrant groups in the UK. This includes variation in differentials across the life course, as well as variations in generational convergence and assimilation. Although one potential explanation for these findings is provided in chapter 5, particularly relating to the culturally entrenched fertility of immigrants and their descendants from Pakistan and Bangladesh. More research is required in order to explain the distinct patterns of fertility for each origin and ancestry group. For example, it is unclear why the cumulative fertility of Jamaicans is much higher than natives at age 20, but almost disappears by age 40. Similarly, the results of chapter 4 raise the question of whether the observed patterns of childhood socialisation for women with Irish and Jamaican ancestries have the same underlying explanation. Also worthy of future research are the results for migrants from South and East Europe, the Middle East, and North Africa, who show some evidence of 'divergence' from the native norm.

Another interesting question that could be investigated by further research is why the fertility of immigrants from Bangladesh and Pakistan is so different for those under 30, and yet the completed fertility of both groups is fairly similar, (including for their descendants in the second generation). Here, it may be interesting to note recent anthropological research on Pakistani fertility in the UK, which shows that young Pakistani women balance a range of individual, social and cultural factors when making decisions relating to partnership and fertility (Hampshire, Blell, & Simpson, 2012). Nonetheless, there is much that remains unexplained about this process, including differences between Pakistanis and Bangladeshis in the timing of their life course decisions.

This thesis provides evidence that exposure to cultural norms may explain variation in migrant fertility. However, there is much more research that could be carried out to investigate cultural explanations for migrant fertility, (using similarly careful methods, for example to ensure that culture precedes fertility). For guidance, research might look to the literature on

assimilation and acculturation for cultural measures to investigate, for example measures relating to language, social networks, perceptions and norms (Birdsong, 2006; Dekeyser, Puschmann, Swicegood, & Matthijs, 2013; Forste & Tienda, 1996). One problem for the feasibility of such research is the paucity of data sources that include measures of culture and fertility, both for the UK and for other contexts. As such, it is recommended that future data sources aim to collect (time-varying) measures of cultural variation alongside data on fertility for the whole reproductive life course.

At various points, this thesis has suggested the need for new research that studies the fertility of non-migrant ‘stayers’ at origin alongside the fertility of migrants. Among other things, this would allow patterns of convergence to be compared with trends in origin fertility, thereby testing explanations relating to selection and global demographic convergence. The latter is discussed in chapter 2, and with this explanation in mind, research may also provide new insights by comparing different destination countries. For example, one contribution might be for research to examine the variation in fertility for immigrants from the same origin who migrate to different destinations. Similar to the arguments made in chapter 3, this would provide greater information about whether findings can be generalised, and the potential limits of any generalisation.

In general, this thesis has argued that there is a need for research that disentangles overlapping theories and hypotheses relating to migrant fertility. Much more research can be carried out in this regard, including research that clarifies the predictions of many of the hypothesis and how they can be tested. For example, the empirical research in this thesis says little about the hypotheses of disruption, family formation, or selection. Based on this thesis, and the experience of developing the research that it contains, it seems important to recommend that future research thinks carefully about the most appropriate research design when testing different hypotheses (e.g. to avoid the dangers of anticipatory analysis: Hoem, 2014; Hoem & Nedoluzhko, 2014). In

this regard, research may contribute by evaluating the suitability of different methods, for example to show the necessity, or otherwise, of incorporating origin country data.

A range of other future research topics are suggested by the results. Some of these follow from the findings directly, for example the need for future research to be more critical of the ways that migrant fertility has been measured. As such, the literature may benefit from research that compares the sensitivity of findings when using different measures of migrant fertility. For example, it remains to be seen whether the period TFR is a more reliable proxy for completed fertility when used for the second generation than it is for first generation migrants.

Other recommendations are less direct. For example, the findings of this thesis could stimulate new research relating to the broader motivations for studying migrant fertility. The patterns of differentials and convergence that are shown here have implications for population size and composition. Future research might consider these implications, for example by developing national (or perhaps even sub-national) population projections that incorporate assumptions about fertility convergence for different migrant groups.

6.5 Closing remarks

In concluding this thesis, I would like to make a couple of brief, and hopefully not over-indulgent, observations. Over the course of my research, the literature has sometimes seemed incoherent and hard to grasp, while at other times it has seemed like an enormous jigsaw that merely needs piecing together. And yet irrespective of the metaphor, and the criticisms that I have made in this thesis, I have come to realise that my research is indebted to the many researchers who have communicated their insights so diligently. More often than not, I have realised the quality of these insights, albeit sometimes it has taken a while. If I might offer any advice for future researchers who consider the topic of migrant

fertility, I would advise them to be respectful of the history of migrant fertility research. This is something that I have learnt to do over time, and I am continually amazed about the number of new ideas that occur to me one day, only to find several days later that they have been discussed far more eloquently decades beforehand. Migrant fertility research has a long history in demography, and this history overlaps with a range of other disciplines, including: economics, sociology, social policy, psychology, history, and anthropology. There is much to learn from all these disciplines, and the many researchers who have devoted time to the topic. In this and many other respects, migrant fertility has been, and surely will remain, a fascinating topic to read about and research.

References

- Allen, K., & Warrell, H. (2013, August 8). Baby boom drives UK population growth. *Financial Times*. Retrieved from <http://www.ft.com/cms/s/0/7a42c2de-0008-11e3-9c40-00144feab7de.html#axzz3WIAOxn9O>
- Andersson, G., & Sobolev, B. (2013). Small Effects of Selective Migration and Selective Survival in Retrospective Studies of Fertility. *European Journal of Population / Revue Européenne de Démographie*, 29(3), 345–354. <http://doi.org/10.1007/s10680-013-9293-6>
- BBC. (2008, August 21). More long-term migrants to UK. *BBC*. Retrieved from <http://news.bbc.co.uk/1/hi/uk/7574382.stm>
- BBC. (2011). Multiculturalism: What does it mean? *BBC News*. Retrieved from <http://www.bbc.co.uk/news/magazine-12381027>
- BBC. (2013). Booming birth rate “a strain on NHS midwifery services.” *BBC News*. Retrieved from <http://www.bbc.co.uk/news/health-21120593>
- Birdsong, D. (2006). Age and second language acquisition and processing: A selective overview. *Language Learning*, 56, 9–49.
- Buck, N., & McFall, S. (2011). Understanding Society: design overview. *Longitudinal and Life Course Studies*, 3(1), 5 – 17.
- Christensen, K., Doblhammer, G., Rau, R., & Vaupel, J. W. (2009). Ageing populations: the challenges ahead. *The Lancet*, 374(9696), 1196–1208. [http://doi.org/10.1016/S0140-6736\(09\)61460-4](http://doi.org/10.1016/S0140-6736(09)61460-4)
- Coleman, D. A., & Dubuc, S. (2010). The fertility of ethnic minorities in the UK, 1960s–2006. *Population Studies*, 64(1), 19–41. <http://doi.org/10.1080/00324720903391201>
- Crul, M., & Vermeulen, H. (2003). The Second Generation in Europe. *International Migration Review*, 37(4), 965–986. <http://doi.org/10.1111/j.1747-7379.2003.tb00166.x>
- Dekeyser, G., Puschmann, P., Swicegood, G., & Matthijs, K. (2013). Language Use of Migrant Families in Flanders: How Does Family Language Reflect Family Acculturation? Presented at the PAA, New Orleans. Retrieved from <http://paa2013.princeton.edu/papers/132331>
- Dubuc, S. (2012). Immigration to the UK from High-Fertility Countries: Intergenerational Adaptation and Fertility Convergence. *Population and Development Review*, 38(2), 353–368. <http://doi.org/10.1111/j.1728-4457.2012.00496.x>
- European Commission. (2011). Migrants in Europe: A statistical portrait of the first and second generation. *Luxembourg: Publications Office of the European Union*.
- Forste, R., & Tienda, M. (1996). What’s Behind Racial and Ethnic Fertility Differentials? *Population and Development Review*, 22, 109–133. <http://doi.org/10.2307/2808008>
- Grant, J., Hoorens, S., Sivadasan, S., van het Loo, M., DaVanzo, J., Hale, L., ... Butz, W. (2004). *Low fertility and population ageing: causes consequences and policy options*. RAND Corporation.
- Hall, M. (2014, November 26). Population soars due to foreign family baby boom. *Express.co.uk*. Retrieved from <http://www.express.co.uk/news/uk/540073/Population-increase-due-to-migrant-births>
- Hampshire, K., Blell, M., & Simpson, B. (2012). Navigating New Socio-Demographic Landscapes: Using Anthropological Demography to Understand the “Persistence” of High and Early Fertility Among British Pakistanis. *European Journal of Population / Revue Européenne de Démographie*, 28(1), 39–63. <http://doi.org/10.1007/s10680-011-9252-z>

- Harper, S., & Hamblin, K. (2014). *International Handbook on Ageing and Public Policy*. Edward Elgar Publishing.
- Hattersley, L. (1999). *LS User Guide 18: International migration data in the Longitudinal Study*.
- Haug, W., Compton, P., & Courbage, Y. (2002). *The demographic characteristics of immigrant populations*. Council of Europe.
- Heath, A., & Demireva, N. (2014). Has multiculturalism failed in Britain? *Ethnic and Racial Studies*, 37(1), 161–180. <http://doi.org/10.1080/01419870.2013.808754>
- Hoem, J. M. (2014). The dangers of conditioning on the time of occurrence of one demographic process in the analysis of another. *Population Studies*, 68(2), 151–159. <http://doi.org/10.1080/00324728.2013.843019>
- Hoem, J. M., & Nedoluzhko, L. (2014). *Pre-and Post-migration Fertility* (Stockholm Research Reports in Demography). Stockholm University. Retrieved from http://www.suda.su.se/SRRD/SRRD_2014_18.pdf
- House of Lords. (2015). Population: International Migration Question (2.53 pm) - Asked by Lord Green of Deddington. Retrieved from <http://www.publications.parliament.uk/pa/ld201415/ldhansrd/text/150316-0001.htm#1503166000476>
- Kulu, H., & González-Ferrer, A. (2014). Family Dynamics Among Immigrants and Their Descendants in Europe: Current Research and Opportunities. *European Journal of Population*, 30(4), 411–435. <http://doi.org/10.1007/s10680-014-9322-0>
- Lynn, P. (2009). *Sample Design for Understanding Society*. Retrieved from <http://research.understandingsociety.org.uk/publications/working-paper/2009-01.pdf>
- Lynn, P., & Kaminska, O. (2010). *Weighting strategy for Understanding Society*. Understanding Society at the Institute for Social and Economic Research.
- Mason, R. (2012, October 25). One in four British babies born to foreign mothers. Retrieved from <http://www.telegraph.co.uk/news/9634127/One-in-four-British-babies-born-to-foreign-mothers.html>
- Murphy, M. (2009). Where have all the children gone? Women's reports of more childlessness at older ages than when they were younger in a large-scale continuous household survey in Britain. *Population Studies*, 63(2), 115–133. <http://doi.org/10.1080/00324720902917238>
- Ní Bhrolcháin, M., Beaujouan, É., & Murphy, M. (2011). Sources of error in reported childlessness in a continuous British household survey. *Population Studies*, 65(3), 305–318. <http://doi.org/10.1080/00324728.2011.607901>
- ONS. (2012). *International migrants in England and Wales, 2011*. Retrieved from http://www.ons.gov.uk/ons/dcp171776_290335.pdf
- Parekh, B. C. (2000). *The future of multi-ethnic Britain: report of the Commission on the Future of Multi-Ethnic Britain*. Profile Books.
- Rendall, M. S., & Ball, D. J. (2004). Immigration, emigration and the ageing of the overseas-born population in the United Kingdom. *Population Trends*, 116, 18–27.
- Robards, J., Berrington, A., & Hinde, A. (2011). Estimating fertility rates using the ONS Longitudinal Study-what difference does the inclusion of non-continually resident members make? *Population Trends*, 144.
- Robards, J., Berrington, A., & Hinde, A. (2013). Identifying biases arising from combining census and administrative data – the fertility of migrants in the Office for National Statistics Longitudinal Study. *Longitudinal and Life Course Studies*, 4(3), 258–267.

- Smallwood, S., & Duke-Williams, O. (2006). The Matrix reviewed: Relationships in the 2001 Census. Presented at the European Population Conference, Liverpool. Retrieved from <http://epc2006.princeton.edu/abstracts/60503>
- Sobotka, T. (2008). Overview Chapter 7: The rising importance of migrants for childbearing in Europe. *Demographic Research*, 19, 225–248. <http://doi.org/10.4054/DemRes.2008.19.9>
- Spencer, S. (2011). *Policy Primer: Integration*. Oxford: Migration Observatory. Retrieved from <http://www.migrationobservatory.ox.ac.uk/sites/files/migobs/Integration%20Policy%20Primer.pdf>
- The Telegraph. (2010, May 26). Birth rate falls in England for first time in almost a decade. Retrieved from <http://www.telegraph.co.uk/news/uknews/immigration/7764311/Birth-rate-falls-in-England-for-first-time-in-almost-a-decade.html>